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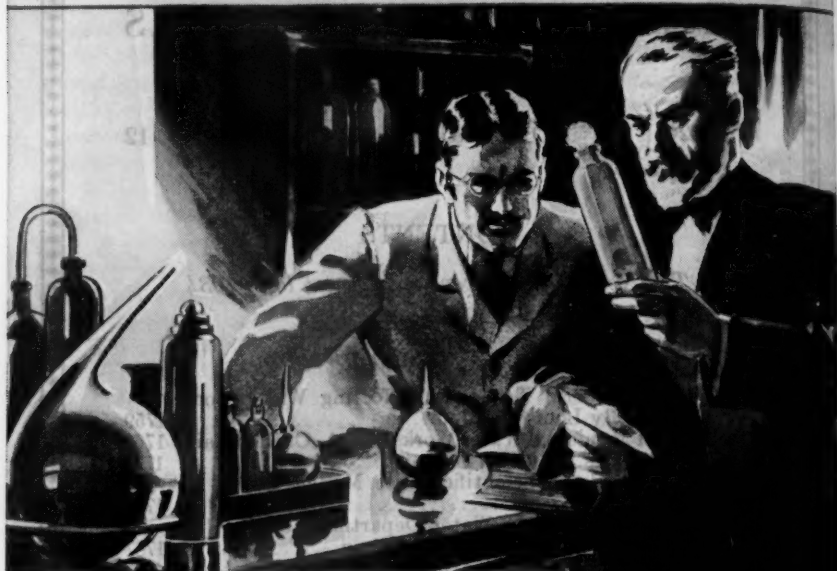
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• • FAMOUS VICTIMS OF WATER BORNE DISEASES



LOST TO THE CAUSE OF HUMANITY —LOUIS THULLIER, SCIENTIST

Water Works Eng.
Vol. 87-7

STRANGE irony of fate that Pasteur, founder of modern preventative medicine, should lose not only his brilliant assistant, Thullier, through death from cholera...but...in addition, two of his cherished daughters from typhoid fever—both water-borne diseases.

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Vol. 26 DECEMBER, 1934 No. 12

CHANGES IN FEDERAL TAX LAWS AFFECTING WATER
COMPANIES

By LOUIS D. BLUM

(Certified Public Accountant, New York, N. Y.)

The Revenue Act of 1934 was signed by President Roosevelt on May 10, 1934 and became effective insofar as income taxes are concerned for taxable years beginning after December 31, 1933. Taxpayers filing returns on a fiscal year basis, which for income tax purposes means any accounting year other than one ending on December 31, are not controlled by the Revenue Act of 1934 for taxable years beginning before December 31, 1933.

Under the several laws rate structures and the elimination of certain classes of deductions have constituted the major changes, although some of the Acts contained unusual provisions which did not appear in other Acts. For example, the Revenue Act of 1932 contained a provision which permitted taxpayers to carry over a net loss incurred in one year as a deduction in the succeeding year. This provision was repealed under the "National Industrial Recovery Act," effective January 1, 1933. No provision for the deduction of net losses is incorporated in the Revenue Act of 1934.

While the Revenue Act of 1934 contains many new provisions, it has eliminated some of the established principles which were incorporated in prior laws.

In attempting to state the changes in Federal Tax Laws affecting water companies under the Revenue Act of 1934, I necessarily have

been compelled to limit the items covered to those which appear to be of most interest to that class of taxpayer. I have not confined myself to actual changes in the Revenue Act, but have included herein information relating to depreciation allowances with respect to which the policy of the Treasury Department has recently been changed. While the provision in the Revenue Act of 1934 applicable to depreciation is identical with the similar provision in the prior Revenue Act, the policy of the Treasury Department now applicable to the proper determination of such allowance has recently been changed.

The several items selected for discussion are those which appear to be of general interest and include depreciation, limitations on stock losses, capital gains and losses, consolidated returns and capital stock and excess profits taxes.

DEPRECIATION

During the consideration of the Revenue Act of 1934 by the Committee on Ways and Means it recommended incorporating in the bill an arbitrary reduction of 25 percent in all depreciation allowances for the years 1934, 1935 and 1936. It was estimated that such reduction would increase the revenues from income taxes approximately \$85,000,000.00.

The Secretary of the Treasury prevailed upon the Committee on Ways and Means that the situation could be more equitably handled through proper administrative measures than through legislation which would arbitrarily reduce each and every taxpayer's depreciation allowance by a certain percentage, whether or not the allowance may have been excessive for past years. The Secretary of the Treasury expected that depreciation allowances could be reduced by a sum sufficiently large to produce the \$85,000,000.00 increase in revenues which the arbitrary reduction was expected to produce.

Under date of February 28, 1934, Treasury Decision No. 4422 was issued relating to the method of computing depreciation allowances. This Decision amended Article No. 205 of Regulations No. 77 promulgated under the Revenue Act of 1932.

The Article as originally drawn provided the following:

"While the burden of proof must rest upon the taxpayer to sustain the (depreciation) deduction taken by him, such deductions will not be disallowed unless shown by clear and convincing evidence to be unreasonable."

The above provision has been amended to read:

"The burden of proof will rest upon the taxpayer to sustain the deduction claimed. Therefore, taxpayers must furnish full and complete information with respect to the cost or other basis of the assets in respect of which depreciation is claimed, their age, condition and remaining useful life, the portion of their cost or other basis which has been recovered through depreciation allowance for prior years, and such other information as the Commissioner may require in the substantiation of the deduction claimed."

The change in the procedure is not confined to the year 1934 and succeeding years, but all Articles of prior regulations as far back as Regulations No. 62 under the 1921 Act have been amended. Deficiencies may be determined based on adjustments of depreciation for all years which are not barred by the statute of limitations beginning with the year 1921.

On April 4, 1934 the Commissioner of Internal Revenue issued mimeograph No. 4170 prescribing information required in support of depreciation deductions which is summarized below:

(1) The deduction is limited to such ratable amount as may reasonably be considered necessary to recover during the remaining useful life of the property, the unrecovered cost or other basis, under the applicable law and regulations.

(2) Failure to deduct any depreciation allowance or an allowance inadequate under the facts known in prior years will not warrant the allowance of a greater deduction in subsequent years.

(3) The taxpayer is required to prepare all schedules and other data deemed necessary in proving the correctness of the depreciation deduction.

(4) In cases where the deduction for depreciation is a very minor factor in determining net income, or where the facts indicate that the deduction claimed in the return is not in excess of the correct amount, or where it is clearly evident that no taxable income will be developed, the schedules need not be furnished for such years.

(5) Where it is claimed by the taxpayer that the information necessary for the proper determination of the allowable depreciation has been previously prepared and filed in connection with prior income tax returns, no duplication of such information is required provided the Revenue Agent makes an affirmative statement in his report that the information is on file with the Department and that it conforms with the requirements of mimeograph No. 4170.

The schedule suggested by the Treasury Department, which may be varied to suit the needs of a particular taxpayer, is designed to show the following information:

The property accounts should be segregated into groups of accounts containing similar assets having approximately the same average

lives. For water companies a general grouping for depreciable assets along the lines indicated below is suggested by the writer:

Dams
Reservoirs
Wells
Intake and Supply Mains
Coagulating Basins
Filters—Slow Sand
Filters—Mechanical
Pumping Station Structures
Boiler Plant Equipment
Steam Power Pumping Equipment
Miscellaneous Pumping Equipment
Storage Reservoirs, Tanks and Standpipes
Distribution Mains
Service Pipes and Stops
Meters, Boxes and Vaults
Fire Hydrants
General Structures
General Equipment
Transportation Equipment

If the taxpayer keeps a record of each individual item or classifies its accounts into a large number of different groups, the data should be summarized by classes of assets similar in nature. Examining officers are instructed to verify the correctness of summaries from the taxpayers books and records.

In the schedules the original cost or other basis of the property and gross additions by years must be set forth separately. The schedule for each class of assets should show all adjustments to the property account which should have been made in prior years representing assets fully depreciated, sold, abandoned or retired.

The accrued depreciation reserve against each annual installment of additions must be shown with proper adjustments for property sold, abandoned or retired. Credits to the reserve for salvage value should be shown separately and any charges against the reserve for repairs, renewals or fully depreciated assets that have not been recovered as expense or otherwise in closing prior income tax returns should likewise be set up separately.

With reference to the computation of the reserve for depreciation the following is quoted from "Memorandum No. 891" issued by the Treasury Department:

"... if the rates allowed for any prior year were in excess of the rates now considered allowable, the rates actually allowed must be used. If the rates allowed were less than the rates now considered allowable, but were such rates as would have been considered allowable in prior years, the rates actually allowed may be used. If, however, no depreciation was actually allowed for any prior year, or if it is evident that the rates or amounts allowed were insufficient, such rates as it is considered were properly allowable in prior years should be used in computing the reserve."

The new rules laid down for the computation of depreciation by the Treasury Department clearly indicate that taxpayers will not be allowed depreciation allowances computed in a haphazard manner and that full and complete information must be furnished. This procedure no doubt will have a great influence on the bookkeeping for capital assets which as a general rule has been very unsatisfactory in the past. In order to substantiate depreciation deductions for a number of utilities represented by the writer it was necessary to make a complete analysis of the property accounts which in some cases dated back to the inception of the company. The ordinary fixed capital account often contains charges which must be eliminated in order to determine the depreciable base for tax purposes. The items most frequently found are land, going value, organization expenses, franchises, interest and taxes capitalized, discount and expense on the sale of securities, appraisal increases, capital stock of underlying companies, etc.

While there has been insufficient time since the new rules have been effective to learn what the policy of the Treasury Department will be in following them, it is believed that no depreciation deduction will be allowed if it is a material factor in determining taxable income unless the information is supplied by the taxpayer in the form outlined.

LIMITATION ON STOCK LOSSES

Capital gains and losses

Section No. 23 (r) of the Revenue Act of 1932 provided a limitation on losses from sales or exchanges of stocks and bonds which are not capital assets, such assets being defined as those held for more than two years not including stock in trade.

This section of the 1932 Act permitted the deduction of losses only to the extent of gains from stocks and bonds held for less than two years. In the law as originally enacted, it was provided that losses disallowed for the reason that they exceeded gains from

similar transactions, could be deducted from gains derived in the succeeding taxable year from the sales or exchanges of stocks or bonds. This carry-over feature never became effective as Section No. 23 (r) was repealed by the National Industrial Recovery Act, effective as of January 1, 1933.

No similar provision was incorporated in the Revenue Act of 1934 but Section No. 117 providing for the recognition of gain or loss from the sale or exchange of capital assets was incorporated.

Under the Revenue Act of 1934, the two year provision is omitted from the definition of a capital asset, such definition being as follows:

"For the purposes of this title, 'capital assets' means property held by the taxpayer whether or not connected with his trade or business, but does not include stock in trade, etc."

Taxpayers, other than corporations, are required to apply certain percentages of reductions to gains or losses from the sale or exchange of capital assets depending on the number of years that the assets were held.

While corporations are not included among the taxpayers which must apply this graduated percentage of reduction to capital gains or losses, nevertheless, the same definition of capital assets applies and losses are limited to \$2,000.00 in excess of capital gains.

Under the Revenue Act of 1934 corporations must include as taxable income gains from capital assets but capital losses may be deducted only to an amount of \$2,000.00 in excess of capital gains.

CONSOLIDATED RETURNS

The Revenue Act of 1932 permitted an affiliated group of corporations to elect to file a consolidated return in lieu of separate returns.

An affiliated group was defined as one or more chains of corporations connected through stock ownership with a common parent corporation if

- (1) At least 95 per centum of the stock of each of the corporations (except the common parent corporation) is owned directly by one or more of the other corporations; and

- (2) The common parent corporation owns directly at least 95 per centum of the stock of at least one of the other corporations.

"Stock" did not include non-voting stock which was limited and preferred as to dividends. The tax rate for a consolidated group was

increased by $\frac{3}{4}$ of 1 per centum under the original provision of the 1932 Act which brought the rate up to $14\frac{1}{2}$ per centum as compared with a rate of $13\frac{3}{4}$ per centum for corporations reporting on a separate return basis.

Under the National Industrial Recovery Act, Section No. 141(c) of the Revenue Act of 1932 was amended fixing the increased rate for the privilege of filing consolidated returns as $\frac{3}{4}$ of 1 per centum for the taxable years 1932 and 1933 and an increased rate of 1 per centum for the years 1934 and 1935.

Under the Revenue Act of 1934 the right to file consolidated returns is confined to railroad corporations and the rate of tax for railroads electing to file consolidated returns is 2 percent more than the regular rate of $13\frac{3}{4}$ percent levied on corporations.

Section No. 45 of the Revenue Act of 1932 which was reenacted in the Act of 1934 authorizes the Commissioner to allocate income and deductions between or among two or more organizations, trades or businesses owned or controlled directly or indirectly by the same interests if he determines that such distribution, apportionment or allocation is necessary in order to prevent evasion of taxes or clearly to reflect the income of any such organizations, trades or businesses. This section of the law has not been applied to any extent in the past but the elimination of the consolidated return feature from the Revenue Act of 1934 with respect to all taxpayers except railroads, may cause the Treasury Department to utilize the procedure provided for in cases where there has been an inter-manipulation of accounts or a shifting of income between members of an affiliated group with the result that the true income is not reflected. Relief under this section of the law is also available to taxpayers who, without its application, might be compelled to pay an excessive tax not based on the true income of the controlled interests.

CAPITAL STOCK TAX AND EXCESS PROFITS TAX

A capital stock tax at the rate of one dollar for each \$1,000.00 of the adjusted declared value of its capital stock was imposed under the National Industrial Recovery Act on corporations carrying on or doing business after June 15, 1933. The first return covered the year ended June 30, 1933 and taxpayers were permitted to declare the value of their capital stock as of the close of its last income-tax taxable year ending on or prior to June 30, 1933. The value having once been declared it could not subsequently be changed either by the

Commissioner or the corporation. The adjusted declared value for any subsequent year ending June 30 was defined under the law as the original declared value plus or minus additions or reductions of capital including adjustments for operating or non-operating gains or losses, dividends, etc.

In addition to the capital stock tax an excess profits tax was imposed under the National Industrial Recovery Act for each income-tax taxable year ending after June 30, 1933 equivalent to 5 percent of such portion of its net income in excess of $12\frac{1}{2}$ percent of the adjusted value of its capital stock.

Section No. 703 of the Revenue Act of 1934 amended the National Industrial Recovery Act by limiting the application of the capital stock tax in respect of any year except the year ending June 30, 1933 and providing that the excess profits tax shall not apply in respect of any taxable year ending after June 30, 1934.

Section No. 701 of the Revenue Act of 1934 reimposed the capital stock tax so that a return must be filed for the year ended June 30, 1934 wherein the value of the taxpayer's capital stock must be declared as of the close of its last income-tax taxable year. For any subsequent year ending June 30 the declared value shall be increased by capital paid in and net income and shall be reduced by payments representing a reduction of capital, dividends and net losses. Several adjustments of a technical nature which I have not mentioned for the sake of simplicity must also be made in some cases.

Under the Revenue Act of 1934 taxpayers who filed capital stock reports as of June 30, 1933 are given an opportunity to make a new declaration of the value of their capital stock for the year ending June 30, 1934. If the prior valuation was too low so that an excess profits tax resulted it may be increased or if the valuation was too high it may be reduced. In arriving at a valuation which will not penalize the taxpayer the average net taxable income under present normal conditions, with due allowance for increases in income, should be capitalized at $12\frac{1}{2}$ percent. If the estimate is correct the excess profits tax will be eliminated. For example, if the average net income of a taxpayer is \$100,000.00 the original declared value should be \$800,000.00 which would result in a capital stock tax of \$800.00 and no excess profits tax. For each \$1,000.00 undervaluation of the capital stock, the capital stock tax would be reduced \$1.00 and the excess profits tax would be increased \$6.25. On the other hand any overvaluation of the capital stock would increase the capital stock tax \$1.00 for each

\$1,000.00 of such overvaluation. The importance of making the proper valuation is obvious and in view of the opportunity that is afforded taxpayers under the Revenue Act of 1934 to make a new declaration any errors that were made for the year ended June 30, 1933 may be rectified in filing the return for the year ended June 30, 1934.

CONCLUSION

In conclusion I wish to say that in my opinion the administration of the tax laws will be stricter than ever before for reason that the government will attempt to realize the greatest amount of revenue from the several sources provided. This is apparent from the action of the Treasury Department in providing the new procedure with respect to depreciation. On the other hand, taxpayers whose volume of business and net profits have been reduced and whose costs are rising must pay particular attention to their tax problems in order to take advantage of all allowable deductions to prevent overpayments.

DISCUSSION

JACOB SCHWARTZ (*Board of Public Utility Commissioners of the State of New Jersey*): Mr. Blum's paper covers a very timely subject in a practical and unequivocal manner.

We have been rather well acquainted during the past few months, through the medium of daily press dispatches, with the attempt on the part of the government to balance our federal budget. Because of this necessity and an aroused public opinion resulting from alleged improper practices disclosed in recent investigations, there was an immediate demand for closer scrutiny of the income tax laws to eliminate so-called "loop holes" and increase revenue.

The 1934 Revenue Act presents us with a fact accomplished and discussion or expressions of disagreement with the merits of the various provisions of the act would be of doubtful practical effect. Mr. Blum has carefully digested the 1934 Revenue Act and set up for our consumption the important changes and their application to water utilities. I was very happy to have the benefit of this analysis by an expert, together with his comments based upon actual experience.

There is a growing feeling that the actual filing of federal tax returns should at least be under the direct supervision of one who has a specialized knowledge of this field. The average accounting officer

has a sufficiently difficult task to plan and supervise the recording of the property records in sufficient detail and in accordance with classifications necessary to provide information, not only for filing of proper tax returns, but for many other purposes. Present conditions call for closer coöperation than ever between the accounting officer, the engineering executive and those who prepare the tax return, in order that each shall be properly informed of the necessary data required.

The paper under discussion brings to our attention again the changing tendency since the advent of the New Deal with respect to the burden of proof. It used to be considered shrewd business to be able to dispose of a blind horse. "Caveat emptor," let the buyer beware, was the law. "Prove that I am wrong" was the cry of one whose statements were challenged. The New Deal has, however, changed the old expressions and we now hear that a seller is in duty bound to make a full and frank disclosure with respect to his commodity, and we are also advised by the government to prove that our figures are correct. The government does not intend to be saddled with the expensive burden of proving that you are wrong. I may be digressing, but there can be no better argument for adopting and adhering to a good fixed property record system, a topic which has been near and dear to the hearts of many of the members of this division.

TAXATION OF MUNICIPAL WATER WORKS

BY A. C. KAMPLAIN

(Meter Service Company, Valparaiso, Ind.)

A knowledge of taxation practices is essential to a full and complete discussion of taxation of municipal water works. Widespread dissatisfaction exists as to the practices in general use by taxing bodies. Taxes are created and assessed without much regard for the equitable pro rating of governmental expense, but are created and assessed in the midst of a quandary wherein the taxing bodies are concerned solely with the necessity of raising funds. It seems to be more important to these bodies that the funds be secured than that they be equitably distributed.

For this reason it is difficult to point out improvements which may be made. To do so would entail the building of an entirely new or changed tax structure. As this discussion deals with the taxation of municipal water works only, I have placed the matter before those in our territory who are in a position to comment intelligently on the situation from the water works standpoint. The residue of these comments is brought to you.

During the past few months I have had the opportunity to obtain the reaction of municipal water works operators to the assessment of taxes on municipal water works. I have talked to some thirty or more superintendents, mayors, city attorneys and others engaged in the operation and management of municipal properties.

Without exception these operators are opposed to such taxation and in fact they are opposed to taxes of any kind on these properties.

It is generally maintained that the municipal water works is a property belonging to the community as a whole, furnishing water to those desiring service. It is comparable to a city park or a community building, except that the water works is usually self supporting.

Inequities exist in the assessment of governmental costs which involve the consideration of municipally owned property. The vacant lot owner requires no fire protection on his vacant lot, and yet he is assessed for the payment of fire hydrant charges. Also, the

municipal water works, operated for the direct benefit of the water consumer, receives fire, sewer, police and other services for which certain of the property owners, not water consumers, pay a pro rata share. It is pointed out that these inequities are trivial and that the value of all property in the community is enhanced by the existence of a water works, which tends to minimize these inequities.

Our plan of government does not provide a basis for the taxation of government owned property, and to tax municipal water works plants would seem first to require their separation from the government. This would, it is held, destroy, to a great extent, the incentive for municipalities to own and operate their own water works.

In several cases, the towns contribute large amounts from their general funds toward the operation of their water works and in these cases the management is particularly opposed to taxation.

In general, the question of taxation of municipal water works involves the question of municipal ownership, and there exists no basis under our plan of government for the taxation of these properties.

The Indiana law has been attacked and it is the general opinion of Indiana municipal operators that the law will be held to be unconstitutional.

The municipal operator must study this matter and equip himself to present properly the position of the property which he represents to the legislators in order that the levying of inequitable taxes against the municipal water works will not become a general practice.

DISCUSSION

EMILE J. FRICKER (*Hackensack Water Company, Weehawken, N. J.*): We all appreciate the magnitude of the job which Mr. Kamplain has undertaken in presenting a paper on this subject. There is comparatively little statistical data to which one can refer in preparing a paper of this kind.

There is no question but that Mr. Kamplain's statement with reference to a widespread dissatisfaction existing as to the practices in general use by taxing bodies is true. There is apparently no correlation between the amount of money to be raised and the method by which it is done, namely, through taxation.

The economic situation which has confronted us during the past four years has aroused much interest in the important question of taxation. Our extravagances of the past have brought this about, at a time, when I fear comparatively little can be done in the way of

tax reduction, under existing legislation. More consideration must be given to the demands which the taxpayer places on the community for the services which it has to render.

This phase of taxation has apparently been given no consideration and the intent shown on the part of our taxing authorities seems to have been to place the burden on those who they believe to be in the best position to pay.

Apparently the owner of real estate has been considered the best prospect in the past. Real estate in the State of New Jersey carries over 80 percent of the tax burden of that state. Our taxing authorities have for a long time overestimated the ability of those who own real estate to pay, and until such time as a drastic change is made in our tax laws which will bring about a wider distribution of the burden of taxation, I fear that real estate is going to lose its attractiveness as an investment, if it has not already done so.

I am opposed to any additional forms of taxation as they will only defeat the purpose behind them, but favor a complete change in the legal setup covering taxation as it applies to real estate. We all realize the needs for funds to operate our government, but I have never heard a satisfactory explanation of why everybody, whether they are property owners or not, should not contribute directly to the upkeep of their government.

Taxation as practised at the present time results in a penalty for the ownership of property, the better the house the more taxes one has to pay regardless of what his demands on the community may be.

Utilities, both privately and municipally owned, because of their interest in the development of the territory they serve should get solidly behind a movement which will bring about a more equitable distribution of the tax load.

Why should values be used exclusively as a basis of taxation on real property? It is my opinion that such a basis is ruinous, especially in such times as we have been experiencing, and that the basis should be the income derived from property.

Property owners have been obliged to make substantial reductions in rentals and in addition have had many vacancies to contend with, but their tax bills have been only slightly reduced.

The municipal water works should be divorced from any and all other municipal functions. It should be on a self supporting basis and receive its revenues to operate, only from those who are directly served by it. The man who makes no demand upon this department

should not be obliged to bear any portion of the expenses involved until such time as he becomes an actual water consumer.

While it may be quite true that in some states the existing government does not provide a basis for the taxation of government owned property yet there are states in which such provisions are made under certain conditions.

Under the laws of the State of New Jersey lands acquired within the city limits by a city for purposes purely municipal are exempt from taxation. Under a supplemental act, however, lands of a municipality used for water supply purposes and located without the city limits are subject to taxation by the respective taxing districts within which such lands are situated at their true value, but such values cannot include improvements of any kind. Under the general tax laws the lands and improvements of privately owned utilities are taxable at their true value.

Improvements in some instances involve many miles of pipe lines which run through many communities between the source of supply and the point of distribution. Such mains privately owned are taxable under the general tax laws, but if municipally owned they are exempt from taxation. This discrimination is unfair to the taxpayer and benefits the water consumer and results in loss of taxes which the communities would receive under private ownership of these improvements.

The purchase of property by a municipality for water works purposes within its own boundaries naturally results in the loss of revenues to the city.

It is therefore my opinion that the property of municipally owned water works should be taxed in the same manner as property owned by private enterprise, which tax should be passed on to the consumer. In this way those who make demands upon the municipal water works for service would properly bear the entire cost of such service. The deficit as a result of loss in taxes on the property acquired by the municipality which otherwise would have to be made up by the community as a whole would be taken care of in this way. In other words, the entire cost of operating the municipally owned water works, including proper taxes, should be borne by those making the demands for service and no portion of the operation of this plant should devolve upon the taxpayer at large.

WORK INCENTIVES

BY HAL F. SMITH

(Department of Water Supply, Detroit, Mich.)

What does the average municipal plant offer its employees as an incentive to put forth their best effort to the task assigned them? Before attempting to answer this question, let us list the usual and ordinary incentives and consider them later one by one: 1, financial incentive; 2, promotion; and 3, steady employment.

In order to be in a position to discuss incentive 1, that is, financial incentive, in terms of proven facts rather than personal opinions, I secured certain facts pertaining to the present status of the Commercial Bureau of one of the largest municipal water departments in the country. The case here presented is, we believe, typical of municipal departments throughout the land.

To the credit of this department is the fact that they realized that in order to reward meritorious service properly, some impartial method of determining the employee's service value must be discovered and applied. To this end, they adopted the Probst Service Rating System. Through the operation of this system, a definite service value rating is placed on each employee. Time does not permit a detailed description of this plan but it turns out service value ratings in letters ranging from "A" to "E" with "A" at the top and "E" at the bottom of the service value scale. "C" represents the average employee. "D," or below, is considered unsatisfactory. Anything above "C" is above average in varying degrees, with "A" standing at the top as the highest obtainable rating. The service rating system now in use in this department is not yet serving as a basis for salary rate, but has been in use for experimental purposes for the last two years. It is not yet known to what extent this system will be used to regulate the salary rate, but it certainly answers our question as to what financial incentive is *now* being offered by municipal departments to their employees to put forth their best effort to the task assigned.

The entire personnel of the Bureau, above mentioned, is listed in

TABLE 1
Service rating and pay of various employees

TITLE	EMPLOYEE NUMBER	SERVICE RATING	ANNUAL BASE SALARY	AVERAGE SALARY TO EACH LETTER WITHIN THE GROUP
			dollars	dollars
Principal clerk.....	1	A	2460	As indicated
	2	A	2460	
	3	B+	2460	
	4	C+	3060	
	5	C	3000	
Senior clerk.....	1	A	1980	A 1980 B+ 2190 B 2235 C+ 2126 C 2340 D 2310 E- 2220
	2	B+	2400	
	3	B+	1980	
	4	B	2400	
	5	B	1980	
	6	B	2220	
	7	B	2220	
	8	B	1860	
	9	B	2400	
	10	B	2400	
	11	B	2400	
	12	C+	2220	
	13	C+	1860	
	14	C+	2040	
	15	C+	2100	
	16	C+	2400	
	17	C+	2400	
	18	C+	1860	
Junior clerk.....	19	C	2220	B+ 1560 B 1630 C+ 1740 C 1770 E 1740
	20	C	2400	
	21	C	2400	
	22	C	2400	
	23	C	2220	
	24	C	2400	
	25	D	2400	
	26	D	2220	
	27	E-	2220	
	28	E-	2220	
	1	B+	1560	
	2	B	1560	
	3	B	1740	
	4	C+	1740	
	5	C	2040	
	6	C	1740	
	7	C	1560	
	8	C	1740	
	9	E	1740	

TITLE	EMPLOYEE NUMBER	SERVICE RATING	ANNUAL BASE SALARY	AVERAGE SALARY TO EACH LETTER WITHIN THE GROUP
			dollars	dollars
Billing machine operator.....	1	A	1560	A 1560 B+ 1680 B 1716 C+ 1680
	2	B+	1680	
	3	B	1740	
	4	B	1740	
	5	B	1680	
	6	B	1680	
	7	B	1740	
	8	C+	1680	
Calculating machine operator.....	1	B+	1740	As indicated
	2	B	1680	
	3	B	1680	
	4	D	1740	
Junior typist.....	1	C+	1680	C+ 1680 C 1720 C- 1710 D- 1680
	2	C+	1680	
	3	C	1740	
	4	C	1740	
	5	C	1680	
	6	C-	1680	
	7	C-	1740	
	8	D-	1680	
Delinquent bill collector.....	1	B+	2220	As indicated
	2	B+	2220	
	3	C+	2220	
	4	C+	2100	
	5	C	2220	
	6	C	2220	
	7	D-	2220	
Addressograph machine operator.....	1	B+	1680	As indicated
	2	C+	1680	
Senior stenographer.....	1	B	1980	
Junior stenographer.....	1	C-	1740	
Meter inspector.....	1	C	2220	
Meter reader.....	1	C+	2220	
Messenger.....	1	B	1020	

table 1 showing, at the left, the title of the position, followed by the number of the employee (for obvious reasons, the employee is designated by number rather than by name). This is followed by the

letter indicating service value, and that by the salary now being paid, and at the extreme right, the average salary paid to the "A's," "B's," etc. within each separate classification.

The tabulation in table 1 shows that there is no relationship between rate of pay and service value, except that it does indicate a distinct tendency to fix the salary rate in an inverse order to service value.

It should be understood that there was, of course, no intent to fix the salary rate in inverse order to service value, but is simply the result of operating on a pay plan that does not take service value into consideration and further by the fact that all scheduled salary increases were held up for the last several years, thus preventing employees of high service value from reaching at least the pay level of low service value employees.

Let us consider now incentive 2, promotion, and, in so doing, let us refer to the records of this same Bureau. The records show that in the last three years there were just five promotions:

Messenger no. 1 to junior clerk
Junior clerk to senior clerk no. 19
Junior clerk to senior clerk no. 23
Junior clerk to senior clerk no. 27
Junior clerk to senior clerk no. 28

Were these particular employees selected for promotion as a reward for conscientious efficient service? The above service value chart contains the answer to this, so let us have a look. We find the promoted employees stand as follows in service value:

Messenger no. 1, B
Senior clerk no. 19, C
Senior clerk no. 23, C
Senior clerk no. 27, E-
Senior clerk no. 28, E-

Well, that seems to be the answer to the question so far as the promotion incentive is concerned.

Incentive 3, permanent employment. There are plenty of facts and figures of record to support the claim that permanent employment is not even offered as an incentive for efficient service. It cannot be where the seniority rule is in force, as, I am told, is the case in most municipal departments. When the lay-off order comes through the employees with the lowest seniority standing go, regardless of

anything else, and often those are the employees who stand the highest in service value.

To get back to our original question, what does the average municipal plant offer its employees as an incentive to put forth their best effort to the task assigned them?

Generally speaking and realizing that there are some exceptions, the answer seems to be "nothing." We realize, of course, that this conclusion is arrived at on the premise that the one municipal bureau studied is typical of municipal departments throughout the country and that, if our premise is wrong, then naturally our conclusion is wrong. We believe, however, that there can be no serious disputing of the supposition that the premise taken is sufficiently accurate to justify the general conclusion, with the reservation that there may be, and probably are, some noteworthy exceptions.

The fact that municipal departments do not generally provide incentives for best efforts does not mean, therefore, that no municipal employee does his best. The contrary is often true, but in all such cases, the incentive arises from other forces or agencies, such as, previous training wherein correct work habits were strongly formed; the desire to excel in his particular field; or to obtain the satisfaction of doing a job right. Unfortunately, such incentives apply to or attract but a small minority, and even these, at times, falter or slip entirely into the rut of mediocrity because of the daily evidence of failure of the department to recognize and reward merit.

Any number of authoritative works will substantiate our claim that there is a variation of 100 percent, or more, in production results or service value between employees who are doing their best and those who are not. It is, therefore, obvious that our failure to get the best out of our employees is increasing costs tremendously.

How then can we induce municipal employees to put forth their best efforts to the task assigned?

The answer to this question is being sought by managers throughout the country and is receiving the attention of the country's leaders in the field of municipal personnel research.

I am not, therefore, sufficiently presumptuous to claim that I have a ready answer, but I do have some suggestions in mind that are here offered in the hope that they will at least direct your attention to this question and that they may, in a small way, contribute to its solution.

METHODS OF IMPROVING PERSONNEL

The seniority rule is in some instances standing in the way of all attempts to provide satisfactory work incentives, and in other instances, has a decided tendency to do so. I would, therefore, suggest its modification. I say this with full realization that the seniority rule, in spite of its many faults, has served a useful purpose. It prevented, or at least minimized, the evils of the spoils system in that it served to prevent personal, political, or religious favoritism, but we are now ready for the next step—the *merit system*.

The successful operation of this system requires some satisfactory method of determining merit or service value. There have been many rating systems devised and tried out and all have been found wanting in some respect or another, but just because perfection has not yet been reached, is no reason for abandoning the idea. Of course, we must have a system that is at least workable and reasonably accurate, and, in my opinion, the Probst Rating System is both workable and reasonably accurate. There may be others just as good or better—I do not know—but eventually the best system will be discovered and used.

The principal weakness of the Probst System, as I see it, is the difficulty in obtaining uniform results throughout the department where the cards are marked by several different groups of rating officers, that is, a rating of "B" in one division may not represent the same service value as a "B" in some other division. This is due to the different standards of value in the minds of the various rating officers and can be eliminated or minimized by proper training of the rating officers.

This weakness leads to a second weakness that can be easily corrected. It is that the system undertakes to make too fine a distinction in service value. It provides for fifteen different grades, using the letters A to E, with a plus or minus to each letter. As previously stated, the system is not sufficiently accurate for such a fine distinction, nor is anything accomplished by such a fine distinction, except to create dissatisfaction among the rated employees. My suggestion would be to use three grades only—above average, average, and below average, designating them A, B, and C, respectively. This system would, I believe satisfactorily rate each employee in terms of service value and would, therefore, make possible the adoption of some such work incentive plan as is outlined below:

Financial incentive

1. Properly classify all positions.
2. Establish a salary rate for each class with a set minimum and maximum with two or three intermediate steps.
3. Adopt a rule to the effect that all employees start at the minimum of their grade and that they advance to the maximum as follows:
 - (a) "A" employees advance one step a year until maximum is reached.
 - (b) "B" employees advance one-half step each year until maximum is reached.
 - (c) "C" employees do not advance at all.

Promotion

1. Limit eligibility to "A" employees.
2. Subject all applicants to a competitive examination.¹
 - (a) Free answer test, dealing entirely with the details of the duties of the position applied for.
 - (b) Short answer tests to determine general intelligence, aptitude, etc.

Such an examination would give the employee who is in direct line and who has been understudying the job, perhaps for years, a distinct advantage, and that is as it should be, but it does not arbitrarily exclude others who believe they are just as able to handle it.

Steady employment

When it becomes necessary to lay off employees for lack of work or funds, begin with the "C" group of employees and arrange the lay-off order within this group with due consideration given to seniority and the welfare problem.

Attention is called to the fact that, while under this plan, no direct reward is given for seniority, it certainly does not discriminate against it. In fact, it does indirectly reward seniority by rewarding service value because the service value of all employees should increase each year up to a certain point. If their service value does not increase with length of service, I can see no reason under the sun why they should receive additional reward. The fact that they have not advanced in service value indicates generally that they are below

¹ The examination to be divided into two parts, weighted evenly.

average employees because, among other things, of a lack of ambition or ability, and yet it is this group who, under the seniority rule, is receiving the highest pay, often getting the promotions, and is assured of steady employment.

This paper is not intended as a criticism of any individual or organization, but is simply a statement of a condition that exists more or less generally throughout the country. The responsibility for this condition cannot be placed upon any individual or upon any organization but is the result of a system that has outlived its usefulness. This condition has led to a problem of such magnitude that it now stands as a challenge to personnel men throughout the United States of America.

DISCUSSION

D. V. ADDY (*Budget Director, Detroit, Mich.*): It was with more than usual interest I read the paper on "Work Incentive" prepared for the convention of American Water Works Association and the comparison made of the result of the Probst Rating System to the Department's pay schedule.

While the Probst Rating System is new, and still in experimental stages, the startling picture disclosed by the paper automatically raised the question of whether these results were limited to the one department, or whether the same condition obtained in other departments or services.

Contrary to my original thought it was found that to a varying degree the same results were reflected in other services which emphatically emphasizes the necessity of departing from the 100 percent seniority rule as the basis of financial recognition without going into the correctness and possible shortcomings of the Probst Rating System, or possibly I should say the lack of uniformity, in evaluated personnel by the various marking offices. There is one reason that can be designated as somewhat responsible for this condition. It is a known fact that during the platinum era just prior to the depression, the Civil Service Commission had considerable difficulty in recruiting a proper grade of employees for the various services of the City. In fact, restrictions of age and residence were waived in certain classifications and increased pay schedules were offered in order to attract competent applicants.

During the early part of the depression this condition was exactly reversed and college graduates and well equipped applicants were

received for positions of minor grade and lower salary. At about this same period, in July 1930, the automatic salary increase schedule (upon recommendation of the Department Heads) was suspended, and not as yet reinstated with the result that all employees entering the service within the last five years, regardless of their individual qualifications or efforts, remained at the induction salary of their respective grades.

It can readily be seen that willing employees entering the service during this period have not any financial recognition, despite an above average service rating, and many older employees who may not be as efficient or industrious remained at their rate, the result of recommended salary increases, based primarily on their length of service.

In conclusion, I quite agree with your theory of a solution of this problem, but because of an elective body having sole authority of fixing salaries, as exists in most municipalities, I doubt whether we are ready for complete nullification of the seniority rule. It is my opinion that this change can only be made by gradual reductions of recognition on the seniority basis with a gradual increasing on the basis of merit controlled, at least in part, by such ratings as the Probst System, to in some measure prevent personal, political or other favoritisms. In my mind there is no doubt that a change of this system at least in part is fast approaching for the City of Detroit.

WILLIS H. HALL (*Manager, Tax Research Department, Board of Commerce, Detroit, Mich.*): The facts revealed by your analysis are in complete accord with the ideas I have received from a general observation of municipal departments. I believe a similar survey of all municipal departments would reveal the same inequalities of compensation for meritorious service in many other departments.

The adoption of a merit rating plan that will offer equal pay for equal work would be a most constructive move for municipal government. The incentive and morale of ninety percent of our municipal employees would be greatly improved by the adoption of such a plan.

Municipal taxpayers all over the country complain of the high cost of local government, its waste and inefficiency. They suggest revising or changing the form of local government. But no form of local government can reach maximum efficiency until it provides for proper recognition and compensation for the meritorious service of its employees.

C. A. DYKSTRA (*City Manager, Cincinnati, O.*): I find myself in general agreement with the suggestions in the paper on work incentives. We in Cincinnati are finding less and less difficulty in harmonizing our ratings under the Probst System. As these findings become thoroughly trustworthy their use in the fields of compensation and promotion will increase.

It is impossible at any given moment to introduce the merit system on a hundred percent basis and not run into very complex problems of seniority and other rights. What can be done is to attack the problem on its various levels and hope eventually to iron out the difficulties. From a given moment, however, it is possible to inaugurate a sound appointment and promotion policy. Lay-offs will still plague the executive. In the course of time if honest effort is made and continued the difficulties vanish and proper procedures take their place.

Personally I favor demotions on the basis of service ratings as well as promotions. When public employees are assured that good performance and devotion to duty count in public personnel administration, and that inattention and indifference carry their penalties in compensation losses and in demotions, the whole spirit and attitude now found in some places will change very quickly.

Public positions must be considered as opportunities rather than as purely private jobs.

LEONARD D. WHITE (*Commissioner, United States Civil Service Commission, Washington, D. C.*): I have read the paper entitled "Work Incentives" with much profit and I find myself in agreement with the position which Mr. Smith takes. The record of the relation between service ratings and annual salary in a municipal water plant is typical of many branches of the public service, as well as the information about selection of employees for promotion.

We are spending a year on the efficiency rating problem and I hope before we make another series of ratings, which will be due in 1935, that we will have a more defensible system.

MECHANICAL AIDS TO SCIENTIFIC OFFICE MANAGEMENT

By W. P. ADAMS

*(Public Utilities Division, Burroughs Adding Machine Company,
Detroit, Mich.)*

Office management is in the spotlight today, more so, in fact, than at any other time in the history of business. Executives are demanding more complete and more prompt information to guide and supervise the enterprise. The office manager is required not only to produce the facts, but to do so at the lowest cost. Cost in office operations is now being given the same careful attention that production costs have had for many years.

Scientific office management embraces a skillful treatment of the conduct of the affairs of the office, through the application of modern methods. Efficiency and economies are effected in direct ratio to the skillfulness with which the office routine is supervised.

Down through the ages man has slowly but definitely progressed in the art of building tools. Persistently pushing his objective farther and farther into the foreground, better tools have become a reality. Drudgery is pushed into the background. Work is easier and more efficiently performed. The product, as a result, is a more perfect one.

Due to the constant development in mechanical tools, many people will join me in the opinion that life today is broader and holds many more interests in store for the most of us. The higher standard of living that we now enjoy, in a large measure, is traceable to mechanical devices designed to free man from drudgery. So much for the general effect of the tool.

Someone has said that no man should do a job that a machine can do better. In the plant, the best tools money can buy are used for the reason that maximum efficiency is required. Every modern plant is greatly concerned with its production costs. Exhaustive studies have been made and are being made today to keep these costs reduced to the minimum. No job was ever done that could not be done better through changes in methods or tools. Tools

that were best a few years ago are, in many cases, obsolete today because of new mechanical developments. Plant executives do not hesitate to replace them with the newest types.

Today, executives are seeking new ways to reduce office expenses. At the same time they are demanding from their office managers figure facts "hot off the griddle." The problem, "How can increased volume be handled with no increase in clerical cost," is constantly being asked. There is only one answer: through careful analysis and by the application of the proper mechanical tools, office costs can be reduced. Each individual job must be carefully analyzed in order to determine if a better way can be found.

The tools to be found in the factory and the tools to be found in the office are both "Business Tools." There is only one reason for their existence, that is, efficiency at less cost.

The telephone is an outstanding example of the importance of prompt information to modern business. Although the original wall telephone was a great help, to eliminate steps from the desk to the wall, the desk 'phone was introduced, and for even greater convenience we now have available the French type 'phone. Each type of instrument spells progress. The time element is such a factor in modern business that many firms are installing a 'phone on every desk.

During the past 30 years the automobile has supplanted the horse and buggy for both pleasure and business. In the home, the electric refrigerator has supplanted the old familiar ice-box. The electric sweeper has supplanted the old form of carpet sweeper. In the plant, automatic tools are supplanting hand methods. In the office, calculating and adding machines are supplanting the old scratch pad. Accounting machines are supplanting pen and ink bills and ledgers. Typewriters are supplanting the pen and ink letter. Example after example could be used to illustrate the trend of mechanical tools in the home, in the plant and in the office.

Businesses today face the problem of handling an increased volume of business, yet with hourly working limits definitely established. Personnel is, in most cases, limited. There is a decided tendency to mechanize wherever possible in order to increase the efficiency of the present staff rather than to indiscriminately increase the personnel to take care of the volume increase.

During the depression, many utilities curtailed their office staff. Decreased revenues meant limited budgets. We find most organiza-

tions loaded with obsolete equipment carried over from pre-depression days due to a lack of any definite replacement program. Now that business is again on the up-grade, the cost of the office job must again be considered.

More mechanical developments in office machinery have taken place during the last four years than in any ten year period in the office equipment industry. Research and development have progressed without interruption, at great cost, in spite of the depression. These developments are at the disposal of the business man for his profit. From the viewpoint of the employee—a better tool makes his job more pleasant, more interesting and permits him to turn out work that is a credit to himself.

This development has taken place in typewriters, adding machines, calculating machines, bookkeeping machines, billing machines, addressing machines—in fact in most lines of office equipment.

Motion studies, paper handling studies, time studies, system routine and procedure studies, all have had a direct bearing upon the development of the modern machine. The elimination of unnecessary manual operations, such as, applying power to return the carriage of a typewriter electrically, instead of manually; designing a billing machine that will eject bills and pile them in a magazine in the same order as billed, instead of removing each separate bill manually saves time and promotes accuracy. The elimination of mental gymnastics, insofar as is humanly possible, in matters of addition, multiplication and division frees the mind of the clerk, permitting greater concentration on the broader aspect of the job. The time saved is thus available to the clerk for more productive work.

As was pointed out previously the tools of the plant and the tools of the office are both "Business Tools." As executives, do you insist that the same principles of reduced costs be carried out in your office as in your plant? Every office job involves these expenses: salary; furniture (depreciation); insurance; floor space; supervision; and miscellaneous expense.

Do you know whether you are getting the proper return on this investment? The only purpose of office equipment is to make each clerk more efficient and more productive. Cost cutting is essential in meeting today's problem.

Volume is increasing; over-time has been eliminated; and government wage limits have been established.

With increasing volume, business is being faced with one of two

alternatives: either personnel must be increased or the present staff made more efficient and productive.

Adding one clerk, from an investment standpoint, is the equivalent of buying \$10,000.00 worth of office machines.

Twenty-five employees can be equipped with the proper tools to do a better day's work for the same cost as adding one clerk. I am sure that you would rather have twenty-five efficient clerks than twenty-six inefficient clerks.

Every time a clerk is added, supervision must be spread a little thinner, thus decreasing efficiency. Furniture must be provided. Insurance and all other items of overhead affected by personnel must be considered.

By way of comparison, the cost of personnel may be measured in dollars while that of equipment is measured in cents. It is not the cost of the carpenter's saw, it is the carpenter's wages.

Analysis meets the problem of ascertaining what office tools, if any, are necessary, on each job in order to insure the proper efficiency and production for each clerk. Analysis also insures maximum efficiency and correct application of equipment now in use.

The application of the proper tool to the job is of utmost importance. Many times a less automatic machine, at a lesser price, is purchased in preference to a more automatic machine at a higher price. The cost of the carpenter's wages, for the moment, is forgotten in the price being paid for the saw. While it is true equipment cost does enter into the picture, it is only one part of the cost of the job. In order to arrive at a correct conclusion, the cost of the entire job and the results to be obtained must be given consideration.

The "Scientific Office Manager" will find the solution to most of his problems through survey and analysis, leading to the application of the latest types of mechanical equipment to all the various activities in his office.

FINANCIAL HISTORY OF THE WATER DEPARTMENT OF THE CITY OF NEW YORK

BY JOSEPH GOODMAN

(Deputy Chief Engineer, Bureau of Water Supply, New York, N. Y.)

The present City of New York is the result of the consolidation in the year 1898 of various communities located in the vicinity of New York harbor which are now included in the five boroughs of Manhattan, the Bronx, Brooklyn, Queens and Richmond. The water supplies of these communities were developed without regard to the present city limits and it was not until the advent of Catskill water in 1917 that New York was served by a system planned as a whole. Of its 7,200,000 inhabitants, approximately 650,000 in Brooklyn and Queens are still supplied by private companies.

The old City of New York, now the Borough of Manhattan, had no general water supply system until 1842 when Croton water was first introduced.

At the present time all water supplied from the municipal system used for business purposes must be metered. Owners of residential property may, at their option, install meters or discontinue the use of existing meters. If meters are not used in residences payment is made at the "frontage" rates which are based upon the frontage or front width of house, number of stories, number of families, number of bath tubs and toilets. The frontage rates in force up to the end of last year were originally established in the old City of New York by Ordinance adopted March 20, 1851; they remained unchanged for over 81 years. The same ordinance fixed a sliding scale for large supplies required for manufacturing and business purposes from 5 cents per 100 gallons for 200 gallons per day, to 2 cents per 100 gallons from 2,000 to 10,000 gallons per day.

Under laws of 1870, the City was authorized to meter all water used for business purposes and although these rates were then fixed at 10 cents per 100 cubic feet by the Commissioner of Public Works it was not until the year 1900 that it was so fixed by Ordinance. This flat meter rate also remained in force up to December 31, 1933. Extra and miscellaneous rates where the supply is not metered, such as for

building purposes, boilers, lawn sprinkling, refrigerators, etc. were established from time to time as needed. For some years past, approximately one-half of the total revenues was derived from meter rates, the aggregate meter registration amounting to about one-third of the total supply; it has been claimed therefore that the meter rates were twice the frontage rates; when allowance is made, however, for the 10 percent of the total water supplied free to public buildings, for meter slippage, street flushing and other public uses, as well as for the leakage in the street mains and services, this disparity is not so excessive as it at first seems. An extensive investigation of these rates is now being conducted by the Department.

In the old City of Brooklyn the water rents in 1859 were established to be the same as for Croton water in New York City. So-called "regular" rates were charged against houses as well as against vacant lots where distribution pipes were laid, whether water was used or not; the latter varied from 10 cents per foot frontage where lots were assessed at \$1,000 or less to 15 cents between \$1,000 and \$2,000 and 20 cents per foot where the assessment per lot exceeded \$2,000; "extra" rates were charged for water used for manufacturing purposes. Modification in one or the other of these rates were made in 1860, 1862, 1871, 1873, 1879, 1880, 1881, 1884 and 1896. In the last mentioned year, after the annexation of large sparsely settled suburbs, the charge for vacant lots was reduced to 1 cent per front foot for lots assessed at \$100 and gradually increasing to 20 cents per front foot for lots assessed at \$2,000 or over.

West Bronx was annexed to the old City of New York in 1874 and East Bronx in 1895. A municipal supply from the Bronx and Byram rivers was made available in 1884.

Prior to consolidation in 1898 the municipal supplies in Queens and Richmond were almost negligible. After consolidation and as each private water company was acquired, the rates and regulations in all areas served by the municipal system were made uniform.

The annual frontage charges are payable in advance and are due January 1 of each year. If not paid by the end of January a penalty at the rate of 7 percent is charged from January 1. Meter bills are due when rendered; there are no penalties to the last business day of the month following the month when the bill is rendered. Large meters are read and billed once a month, some quarterly, and the small ones twice a year. The number of frontage accounts on December 31, 1933 was 427,311 and the number of meter accounts 154,473.

All water charges within the City constitute a lien upon property. Under laws of 1916, municipalities in Westchester County were authorized to secure water from the New York City system at the meter rates charged within the corporate limits of said City. In 1928 this privilege was extended to municipal corporations and water districts in Ulster, Greene, Delaware, Schoharie, Sullivan, Orange, Westchester and Putnam Counties at rates which are to be based upon actual cost after deducting fixed and operating charges upon the distribution and delivery system within the City limits. In 1928 these rates were fixed by the Commissioner of Water Supply at 75 cents per 1,000 cubic feet for Catskill water and 50 cents per 1,000 cubic feet for Croton water, corresponding to two thirds and one-half, respectively, of the City meter rates in force up to the end of 1933, and are to apply for ten years.

Sing Sing Prison is furnished with Croton water under Laws of 1861 at 2.5 cents per 100 cubic feet, part of the consideration having been the grant by the State of a right-of-way for the Old Croton Aqueduct.

Quite a number of villages, cities and water districts obtain all or part of their supply under those Acts; the revenue from these outside sources in 1933 amounted to approximately \$587,000.

The municipal water supply system represents an investment by the City of \$501,600,000 in round figures. Several substantially constructed distributing reservoirs within the City limits, of comparatively large capacities, supply ponds, well systems, pumping plants and many miles of small distributing mains aggregating in cost possibly 2 percent of the last figure, have been abandoned or replaced with more adequate facilities. The "spot" reproduction cost of this system less the retirements and depreciation including obsolescence, would reach a considerably higher figure. The bonds outstanding at the end of 1933 amounted to \$371,451,000; 65 percent of this amount was issued in connection with the Catskill development. Since the construction of the Catskill system was started 30 years ago, the water bonds have been generally issued for 50 years; relatively few of the outstanding bonds therefore will be redeemed in the next 20 years. The amount of these bonds outstanding will of course be increased by future issues to defray the cost of additions and improvements to the system.

All permanent additions and improvements to the water supply system, including the installation of all water mains, are paid from funds secured by the sale of bonds. The interest rates on these bonds

are usually 4, $4\frac{1}{4}$ or $4\frac{1}{2}$ percent, the true or weighted average rate being $4.14 \pm$ percent. The annual sinking fund contributions for the redemption of these bonds are based upon a 3 percent return thereon. All moneys received from the sale of water are deposited in the General Fund of the City for the reduction of taxes, and all expenditures for water supply purposes, other than capital expenditures for new construction, are paid out of the city treasury. There is no "ear-marking" of the receipts so that they might be used for specific purposes only. If the anticipated receipts from the sale of water in any year are less than the actual expenditures, the deficit must be made up the following year by an increase in the taxes on real estate, or by other means, unless the water rates are increased.

Reliable figures of construction costs, receipts, and disbursements for maintenance and operation as well as for interest on bonds are available from 1832 to date, covering a span of 101 years. Prior to

TABLE 1

	CASH RECEIPTS FROM SALE OF WATER	DISBURSEMENTS	DEFICITS
1898	\$6,465,772.46	\$6,343,919.62	
1933	23,223,014.71	28,223,259.23	
Total 1898-1933...	\$537,294,201.32	\$550,503,951.39	\$13,209,750.07

consolidation in 1898, however, maturing obligations for construction purposes of the several municipalities consolidated into the Greater City of New York were not wholly provided for by sinking funds administered on actuarial lines but some were redeemed from surplus water revenue or tax levies, others by refunding of the debt. Subsequent to January 1, 1898, the sinking funds were founded on correct actuarial basis, so that since the formation of Greater New York a reliable complete financial record of the municipal water supply system is available.

Table 1 is a summary of the financial operations, insofar as they relate to receipts and disbursements, during this period of 36 years. The total deficit, based upon total *revenue* during this period from sale of water, was \$12,653,440.16.

As indicated hereinafter, the larger part of this deficit occurred in the last three years, which was partly due to the increase in fixed charges upon the \$50,000,000 expenditure for City Tunnel No. 2 now nearing completion.

During the past ten years the water revenues increased from \$17,940,179.88 in 1923 to \$24,477,278.72 in 1933, corresponding to an average annual increase in these 10 years of \$653,709.88. In the last

TABLE 2
Financial statement

Receipts:	
Frontage rates.....	\$10,525,581.24
Meter rates.....	10,368,388.56
Frontage and meter arrears.....	1,711,045.33
Interest on water rates.....	521,909.03
Miscellaneous—water.....	139,460.99
Total receipts.....	\$23,266,385.15
Refunds.....	43,370.44
	<u>\$23,223,014.71</u>
Revenues:	
Frontage rates.....	\$13,627,799.68
Meter rates.....	10,703,140.27
Miscellaneous—water.....	146,338.77
	<u>\$24,477,278.72</u>
Operation and maintenance:	
Salaries and wages.....	\$5,265,320.84
Fuel supplies.....	359,518.20
Water treatment supplies.....	163,319.70
Materials.....	187,885.03
Repairs.....	87,662.56
Rental of fire hydrants (private companies).....	458,490.01
Taxes (on prop. outside of city).....	1,066,942.51
Light and power.....	323,590.87
Other miscellaneous supplies.....	178,461.27
Collection of revenue (Fin. Dept.).....	188,000.00
	<u>\$8,279,190.99</u>
Interest on bonds.....	16,111,435.00
Amortization of bonds.....	3,832,633.24
Total disbursements.....	<u>\$28,223,259.23</u>
Deficit on basis of cash receipts.....	\$5,000,244.52
Deficit on basis of revenues.....	3,745,980.51

three of these ten years, however, there was a decrease each year, averaging \$435,409.62 per annum. Such portions of these revenues which were derived from meter rates showed a progressive reduction after 1930 which reflected the business depression; the 1933 revenues

from these meter rates were \$1,677,212.03 or 13.5 per cent below those of 1930, corresponding to an average decrease of \$559,070 each year during these three years, although the revenues from frontage rates showed an increase each year and in 1933 were \$757,262.39 or 5.9 percent more than 1930.

While in earlier years the cash receipts agreed very closely with the revenues set up on the books, collections in the past two years have fallen behind, in the past year as much as \$1,254,264.01.

A financial statement of receipts and disbursements for the year 1933 is given in some detail in table 2.

TABLE 3

YEAR	EXPENDITURES	RECEIPTS	REVENUES
1931	\$26,155,227.15	\$25,744,501.78	\$25,547,319.06
1932	28,546,072.99	24,494,214.15	25,285,901.07
1933	28,223,259.23	23,223,014.71	24,477,278.72
	\$82,924,559.37	\$73,461,730.64	\$75,310,498.85

YEAR	DEFICIT	
	Based on receipts	Based on revenues
1931	\$410,725.37	\$607,908.09
1932	4,051,858.84	3,260,171.92
1933	5,000,244.52	3,745,980.51
	\$9,462,828.73	\$7,614,060.52

The annual deficits in the city's water supply system in 1931, 1932 and 1933, based upon the cash receipts, as well as revenues, were as shown in table 3.

A uniform increase of 50 percent was made in all the water rates, effective January 1, 1934. It is expected that this will result in an increase of over \$10,000,000 in the receipts during the current year, thus wiping out the deficit of last year, with most of the deficit which would have accrued during the current year also if the rates had not been increased.

The outlook for a reduction of the present water rates in the near future is therefore promising.

UNIFORM CLASSIFICATION OF ACCOUNTS SUITABLE
FOR MUNICIPAL AND PRIVATE PLANTS

By E. V. WILLIAMSON

(Public Utility Accountant, Charleston, W. Va.)

While I appreciate the honor of being invited here this afternoon, I am well aware that it is not a personal compliment to me but rather a recognition of the successful record the West Virginia Public Service Commission has made during the past 20 years in the difficult task of building up a rational, sound and liberal system of state regulation of its public utilities. And if I may speak for the Commission with which I formerly was connected for a number of years, I would express the thanks of the State for this gracious recognition of its labors by the American Water Works Association.

It is unnecessary here or elsewhere to suggest the absolute necessity for some form of sound and accurate accounting of the operations of a water works system. To state it is sufficient. And I must appear as an advocate of uniform accounting for both publicly-owned and privately-owned water plants. Inasmuch as practically every state having jurisdiction over public utilities requires a uniform classification of accounts to be observed by privately-owned utilities, this paper will be confined to the advantages to be derived from a more general use of a uniform classification of accounts by municipal water plants.

Such a classification has been in use for several years. I refer to the classification of accounts for water utilities recommended by the National Association of Railroad and Utility Commissioners. This classification is in use in a majority of the states having jurisdiction over water utilities. A few states have classifications slightly different in form. A comparison of these individual state classifications with the national classification shows, however, that they are fundamentally the same, but due to differences of opinion or local requirements some states have seen fit to adopt classifications a little different from the one recommended by the National Association.

Judging from the objections we hear from those who have not had occasion to use, or make any particular study of a uniform classifica-

tion of accounts, there seems to be considerable confusion as to just what is meant by a "Uniform Classification of Accounts." One objection is that it stifles initiative; another that it reduces accounting to a cut and dried formula from which there is no departure; and a somewhat similar one is that by reason of its being uniform there is no flexibility allowed for contingencies. These objections and others clearly indicate a lack of understanding of the purpose of a uniform classification of accounts and its use in connection with the general accounting system of the utility for which it is prescribed. A uniform classification of accounts is not an accounting system. It is a classification of account titles properly arranged, the better to meet the needs of the utility and others interested in its business. Under each account title is a text definitely stating the nature of the items to be entered thereunder. It also contains general instructions pertaining to the preservation of records, the definition of such terms as "cost," "labor," "material and supplies" and other terms used throughout the classification, and an arrangement for the balance sheet and income statements. The classification recommended by the National Association is, of course, based upon sound fundamental accounting principles and the accounts contained therein were developed in each instance from the practical experiences of the business, regulatory bodies, and others interested therein so that the classification is a composite compilation of the best information available at the time it was prepared. Thus, it will be seen that there are no restrictions placed upon the method of keeping a classification. While the instructions are based on sound accounting principles and are in accordance with regulatory procedure, it does not interfere with the mechanics of bookkeeping or the elements of regulatory laws. I have found that a classification may be kept advantageously by all companies affected by it, but that practically every company would, by reason of its own peculiar requirements, keep it under a different method. This is as it should be, for there should be no rigid instructions which would require the subjection of personal endeavor to a formula. Various systems of work orders, shop orders, construction orders and numerous methods of preparing the basis information on vouchers or journals, and the posting of this information to the various ledgers, are in use in the industry, and each company should select the one that will prove the best for its particular method of operating. Furthermore, the classification is flexible, in that it permits any company to subdivide any account

for securing additional detailed information. It does not prohibit, but, on the other hand, encourages the keeping of such detailed information. The classification as prepared indicates the minimum amount of information to be kept rather than the maximum amount. Most classifications are prepared for either large or small operators, the smaller operators not being required to keep as many accounts as the larger ones. However, the classification for smaller concerns is based upon the same general principles as the more extended one and is usually obtained by simply combining certain accounts.

The national classification as it exists today could be used by any municipal water utility regardless of its size without making any changes whatsoever. A municipality, being a public corporation, would not find occasion to use numerous accounts in the classification, out this is true with private corporations. The classification endeavors to provide an account, or a place in some account, for every conceivable transaction which may occur. It is in fact seldom that any utility does find occasion to use all the accounts listed in the classification. However, I would like to state at this point that the present classification of accounts recommended by the National Association of Railroad and Utilities Commissioners has been in use for several years and to my mind is sorely in need of revision. Considerable change has taken place in the water business since it was written. There is need for more information along certain lines and perhaps the need has grown less for information in other lines. It was the desire of the National Association to have a revision of this classification before this time but due to the depression and the attending political upheaval, the work of the Association along this line has been at a standstill for the past three years. Mr. Maltby, Chairman of the New York Public Service Commission, is, at the present time, Chairman of the Association's committee in charge of this work and I hope that he will be able to bring about a prompt and satisfactory revision of this classification. I do not mean that the classification is of no value at the present time or that there were faults in it when it was prepared. All classifications must keep pace with the development of the business for which it is intended and should be revised from time to time.

The West Virginia Public Service Commission, having jurisdiction over municipally-owned water utilities, and realizing the need of having municipal utilities keep a classification of accounts in order that it might secure the proper information necessary to interpret

intelligently accounts of earnings and expenses, depreciation, fixed investment and all the other matters relating thereto, has prepared a special classification of accounts for use by municipal utilities. Due to the fact that West Virginia does not have, with one exception, any large municipally-owned plants, the classification was considerably condensed and two editions prepared, one for small communities and one for the larger ones. These classifications, however, are based upon the same principles and contain the same general arrangement as the classification required for privately-owned water plants and it is very easy to compare the operations of a municipal plant with those of a privately-owned plant. This municipal classification, of course, does not contain accounts which would be used only by a commercial enterprise and it provides certain accounts which permit the city either to operate the water department as a unit of the general city operations or as a separate and distinct department of the city. The classification itself does not contain any instructions as to how the city shall manage its water department, but does provide suitable accounts to record the cost of operations under the method of management used. The surplus account provides the medium for proving the accuracy of the books and after the opening entries are made for the municipal water department the accounting requirements of the surplus account are the same as those for a privately-owned enterprise. Another account is provided which permits the water department to know at all times whether the city owes the water works money or whether it is indebted to the city.

Many advantages of such a classification might be pointed out but time limits the discussion to three of the most important.

1. Its value to the city.
2. Its value to the public.
3. Its value to the regulatory body having jurisdiction over rates.

The advantages of a classification to the city and its water department, as well as to its citizens, are obvious when consideration is given to the fact that any enterprising community should desire its fiscal affairs to be kept in such a manner to permit a ready verification and analysis of all its municipal activities. The operation of a water plant by a city involves practically the same financial transactions as if it were operated privately. Without some standard or uniform classification for recording these transactions it is difficult to determine from an operating standpoint the cost of operations, the actual

revenue applicable to a given period, the investment applicable to the business and numerous day-to-day questions that require proper accounting records for a true answer. Through the use of a uniform classification this information can be readily determined for the use of the city and a barometer is provided for the intelligent guidance of the city officials in the operation of its plant.

The value of municipal figures prepared on the same basis as those of a privately operated plant becomes apparent when we consider the need of uniform comparisons. We are all familiar with the principal controversies over municipal plants. People are divided over the questions of government ownership of utilities and whether or not a municipal enterprise, such as a water plant, should be operated for profit. It is apparent that without accurate information from both private and municipal plants, facts and statistics of their respective operations cannot be fairly compared. If the revenues of a municipally-owned plant are not properly kept and if its income and expenses are not properly recorded, the true cost of rendering the service cannot be determined. By this I do not mean that it would necessarily show a lower cost than for a privately operated plant; it may show a higher cost. In my experience I have found about as many cases where the water department was being charged with improper income and expenses as where it was not being charged with all the expenses it did incur. In one instance where a small city operated a water plant together with a small street lighting system, I found that the cost of all the coal and other boiler plant expense was charged to the water department, and it is common practice for a municipality to allow the water department no credit for public fire protection. Personally, I believe that before any material progress is made in solving these questions municipalities will have to be able to present figures similar to those kept by a private plant.

In connection with rate regulation we know that without accurate information to present to the regulatory body it is impossible for such a body to act with any degree of satisfaction. A uniform accounting system properly kept will bring about a much better understanding of the financial conditions of the municipal water department and enable the regulatory body to ascertain quickly the reasonableness of rates. Moreover, in those states where municipal water works are not subject to state regulation and where rates are fixed by the municipality itself, the necessity is just as great for dependable accounting information, if rates are to be prescribed by other than guess work.

Having pointed out some of the advantages of a uniform classification of accounts for municipally operated plants it may not be amiss to give some of my experiences in connection with the installation of classifications. I recall there was considerable objection among the privately-owned water utilities when the classification was prescribed for them, but the Commission's orders prevailed and we were pleased to find that the worst objectors soon became for the most part our staunchest supporters. The same difficulty has been experienced in connection with the municipally-owned plants with the further difficulty that we have the added handicap of politics. Cities objected on the ground that it would involve additional expense and require the keeping of information in which it could see no useful results. Naturally, any system installed where there has been no system before would require some additional expense. Other cities felt that their system was satisfactory and that they should not be put to the expense of installing a new one. However, as heretofore explained, the use of a classification of accounts does not necessarily involve any change in the system of accounting.

From an accounting standpoint the greatest obstacle to the successful use of the classification has been in the appointing or electing of those who would be in charge of the system. After a municipal election where new officials are chosen it frequently happens that the incoming officials do not have the qualifications for keeping an accounting system and will discontinue the one in use in favor of some method devised by themselves which in their opinion will better answer the purpose. For instance, in one city in West Virginia the water plant had deteriorated to such an extent that it was necessary to have a new bond issue for its reconstruction. In connection with this it was pointed out that through political favor the water plant had been run by incompetent persons and the service had always been poor, and that the plant had finally broken down under this plan of management. The city officials realized that this was probably true to some extent and promised that, if the bonds were voted, the water department would be completely removed from politics and put in the hands of a politically disinterested operator. The bonds were voted and a man secured to take complete charge of the rehabilitation of the water plant and operation of the new system. He was given charge of the accounting end of the business as well as the operating end and in this case they even went so far as to put the water department collections in a separate bank account. It

appeared for a year or so that it was going to be one of the outstanding examples of a municipally operated plant. However, politics again crept in, the man is no longer there and the plant is being operated today very much as it was in the past. The writer installed an accounting system similar to the one now in use by the Commission and it appeared that a first class accounting record would be maintained. Recently, however, I was in this city and found that the system had degenerated into a mere cash transaction system which is not much better than the one in use before.

One of the most amusing situations I had was in a small town in West Virginia where I was instructed to install a system of accounts for its water plant. When I arrived in this little town I called upon the City Recorder who was to keep the system. The City Recorder said, "Well the Mayor should be here also." I said, "Why should the Mayor be here when you are the man to keep the system?" He replied, "That is true, but in this town we can only hold office for one year consecutively, so one year I am Recorder and he is Mayor and the next year he is Recorder and I am Mayor." So, I taught the system to both the Mayor and the Recorder and so far as I know it is still operating very satisfactorily.

There is no reason why the political aspect should not be removed at least to the extent of keeping the same system even though the political complexion of the offices may change. Recently we installed a system of accounts in a small town for its water department. The officer in charge of the system was very enthusiastic. He had considerable bookkeeping knowledge and was well qualified to keep the system. Through a political upset he was put out of office and some months later when we made an inspection we found that our system had not only been discontinued but thrown away by the new man. He explained that he did not know he was required to keep any particular system, that the one he found there did not appeal to him, that he did not understand it and that he had thrown the books away and started one of his own. The outgoing official had, after his defeat, been put out with the incoming official and had offered him no help or assistance in taking over his duties.

These are instances of what happens in small towns, and it is, of course, small towns that we must think of as the majority of municipally operated plants are in small towns. However, another illustration might be given of the working of a municipal classification in one of our larger West Virginia cities. The classification was in-

stalled and in this instance the regular classification for privately operated plants was used with some slight modifications. The city has been able to retain the services of an excellent accountant for a number of years. This man is very conscientious and has kept a good set of water records. However, during a recent rate case when the city was contending for a very liberal depreciation allowance it was found that if this allowance for depreciation was granted the policemen were to get their salaries raised and that there was no intention of keeping the money for the restoration of the water department.

These are just a few of the difficulties encountered in connection with the installing of a uniform classification of accounts, but I firmly believe that the municipalities should make an earnest and conscientious effort to improve their accounting classifications so that there may be an exchange of comparable information which will bring about better operating conditions and economies as well as put the municipalities in a position to compare their cost of operations with those of privately operated plants. I further believe that municipal water rates should be high enough to permit the water department at least to pay its own way without being subsidized from the general taxes.

West Virginia recently adopted a tax limitation amendment to its Constitution which brought about a considerable decrease in taxes on real estate. This resulted in depriving municipalities of considerable revenue and a number of cities operating water plants where low rates have been in effect had to apply to the Commission for increases to be used for the support of their water plants. Due to the fact that prior to the tax limitation the total revenues of the city met the total expenses of all its departments, these cities were not aware that their water departments were not bearing their share of expenses, and I predict that within the near future the West Virginia tax limitation law will bring about a greater improvement in the accounting of municipally operated utilities than all the rules and regulations we have so far had. If necessity drives a careless municipality to the use of needful accounting, why should not a provident municipality embrace such an indispensable system as a simple matter of rational conduct?

DISCUSSION

F. W. SCHULZ (*Assistant Treasurer and Comptroller, Community Water Service Company, New York, N. Y.*): The water works industry

in this country is composed of approximately 77 percent municipally owned plants serving about 81 percent of the population and only 23 percent privately owned plants serving about 19 percent of the population. Over 85 percent of the private and 24 percent of the municipal plants or 40 percent of the total are subject to Commission regulation and no doubt are keeping their accounts as prescribed by the various regulatory bodies. There being no definite data available it cannot be stated what part of the 60 percent not subject to regulation are failing to keep their accounts in accordance with recognized water works practice. However, I believe it can be said with a reasonable amount of assurance that the number of these plants is large and that a great majority of them are municipally owned. The merit or wisdom of having nationwide Commission jurisdiction over accounting for the entire water industry is not being considered in this discussion. However, if that be the only way to place the entire industry on a comparable basis in so far as uniform accounting is concerned, then the sooner it comes about, the better.

Inasmuch as a majority of the industry is not using a uniform classification the first step to be considered in this discussion is neither the form of classification to be adopted nor the procedure to be followed in compiling it. The first step is to convince those municipalities and privately owned plants which are not using a uniform classification that it is not only good business but of benefit to the industry as a whole to place their accounting on a uniform basis.

There is no material difference between a private system and a municipal system other than their ownership. One is managed by its stockholders through the medium of directors and officers elected by them and the other by the voters through the medium of elected or appointed officials. The type of ownership does not change the aspect of the operating problems; the method of distributing water is no different; the physical property is generally the same. Therefore, there does not appear to be sufficient reason why the accounts should not be uniform.

Let us first consider a few of the many advantages that the management may derive from the use of a uniform classification.

As Mr. Williamson pointed out, a uniform classification of accounts is not an accounting system. It does not attempt to prescribe the method in which entries are to be made in the books. It merely acts as a guide to aid in segregating receipts and disbursements by such classifications as have been adopted as standard by 38 state

commissions. From such a segregation the management is able to obtain a clear, concise picture of the operations by functional divisions. It makes available comparisons showing the general trend of the operations and maintenance, the cost of production and delivery of the commodity, the unit costs of the commodity, the efficiency of the equipment and other pertinent data. With this information available any operating defects can be readily detected. It gives the management an opportunity to compare its results with neighboring plants to their mutual advantage. It also expedites the work of the employees handling the accounts thereby giving them an opportunity to devote some of their time to other matters. All of these advantages are essential for sound and economical operation.

I have heard many utility operators make statements something like this:

"I don't need all this fancy accounting and classifications or what have you. I know this plant from A to Z. Any important data I keep in my little memo book."

After questioning these men on matters such as their cost of maintaining the various equipment, the cost of distribution, the amount of additions and retirements by classes, etc., it invariably turned out that the only vital point about which they had sufficient detailed data was the location of the various physical elements comprising the plant and this, because their maps and records were complete and accurate. Many of these same operators are now operating under a uniform system of accounts and a statement from them such as "just try and take it away from us" is sufficient proof of the merits of the system.

Let us consider for a moment, those who furnish the funds in order to turn the wheels of progress. I mean the rate payers and the security holders. Let us ask ourselves a few honest questions. Are the rate payers entitled to know that the amount of money they pay for service rendered is proper? Are they entitled to know that it is being used in the business itself and not diverted to other purposes? Are the security holders entitled to know the true value behind their investments and whether their interest payments will continue to be met? Are they entitled to compare the figures of the plant in which they are interested with those of other plants? The answer to these questions obviously is in the affirmative.

The older John D. Rockefeller once told B. C. Forbes,

"... next to doing the right thing the most important thing in the world is to let the people know that you are doing the right thing."

Some years ago, Charles Evans Hughes, now Chief Justice of the United States, said,

"... public affairs and business which is of a public nature because of its relation to the public interest, shall be conducted in the light of day and that the public shall have the truth, the whole truth and nothing but the truth, in regard to the matters that concern them."

The real facts cannot be laid before them in an understandable manner if the accounts are not systematized.

In a short discussion of this type it is impossible to discuss the multitude of details connected with the designing of a classification of accounts. I believe this problem should be thoroughly considered and made the subject of a round-table meeting at an early date.

This subject has been up for discussion before this division in some form or other practically every year since the division's inception which, I believe, was in 1929. This clearly indicates that the members realize its importance and that some action is desired. I sincerely trust that the splendid talk of Mr. Williamson and this discussion will eradicate any doubt in the minds of any conscientious objectors, if there be such, as to the need for a uniform classification of accounts suitable for both publicly owned and privately owned plants.

Before closing, I would like to make a few suggestions.

1. That this division, at its executive session, adopt a resolution approving the compilation of a uniform classification of accounts suitable for both publicly owned and privately owned plants;
2. That a committee be appointed for the purpose of circularizing the entire industry in order to ascertain its willingness to put in use such a classification; and if the majority agree—
3. Appoint a joint committee representing both types of ownership in order to draft an ideal uniform classification.

In conclusion, let us bear in mind that this problem is one which requires the complete coöperation of all in the water industry for its ultimate solution. If it be left to a small group of individuals working alone the maximum benefits to be derived from a properly designed classification of accounts will not be attained.

THE FEDERAL SECURITIES ACT AND THE FINANCING OF WATER COMPANIES

BY BERNE H. EVANS

(Attorney-at-Law, Harrisburg, Pa.)

The relation of the Federal Securities Act of 1933 to the financing of any company has been the subject of such acrimonious debate and of such serious differences of opinion that it may be well to discuss the Act generally, but not in detail.

The Act is designed to regulate all public offerings of securities, except certain exempt securities and transactions, which make use of the mails or of any means of transportation in interstate commerce, in either offering to sell or in delivering such securities. Before any securities covered by it can be offered, it requires the filing of a Registration Statement with the Federal Trade Commission, which becomes effective 20 days after the filing, unless suspended by the Commission or amended by the issuer, in which case the effective date is postponed.

It further requires that no sale shall be made unless a prospectus, meeting the requirements of the Act and of the Commission, shall have been furnished to the purchaser at or preceding the time of the sale.

The Registration Statement, which is the foundation of the Prospectus, must contain the information set forth in Schedule "A" of the Act, which lists 32 items relating to every phase of the corporation's activities. In the form for the Registration Statement, the Trade Commission requires answers to 56 questions which go into the financial, legal and accounting phases of the company in the greatest detail. Numerous balance sheets and profit and loss statements are required, copies of the articles of incorporation, of annual reports since 1922, all underlying agreements or indentures affecting the issue, all agreements with underwriters, the opinion of counsel, specimens of each security outstanding or to be issued and of all material contracts not made in the ordinary course of business, such as management contracts, etc.

The answers to the questions are, however, not the most serious

feature of the Registration Statement, since it requires that there shall be filed with it numerous schedules and explanations pertaining to the balance sheets and the profit and loss statements which, in a large company, necessitate an enormous amount of accounting work. For example, the schedule indicating the major classifications of the plant, property and equipment account asks for the cost to the issuer and, if that is not available from the time of organization, the cost since January 1, 1922.

Without attempting even to summarize the information required in the Registration Statement, it should be sufficient to say that in the one statement thus far furnished by any large utility, the statement, exhibits and supporting data cover 1850 pages, and that a copy of the statement would cost an inquiring investor \$370.00. The statement shows that the expenses incurred by the issuer in connection with this sale, not including underwriter's commission and discounts, were over \$286,000, and this apparently does not include the expenses of the issuers' own employees who worked for months compiling information.

Under the Act and the rules of the Commission, the Prospectus need not contain all of the data in the Registration Certificate, nor the exhibits and supporting schedules, but it must contain a very complete summary of all statements of material facts and must omit no statement of any material fact necessary to make the statements therein not misleading. The Prospectus in the case above mentioned consisted of 60 printed pages and each purchaser was required to acknowledge receipt of a copy and to state that, in subscribing, he had relied solely on the Prospectus.

The liabilities which are placed upon the issuer, its directors, the underwriter, the accountants, experts, and counsel for even innocent mistakes made in the Registration Statement or Prospectus are so heavy that honest men may hesitate a long time before assuming them, since the burden of proof placed upon them is almost unbearable.

This very brief outline of the provisions of the Act dealing with the Registration Statement and Prospectus, ignoring the numerous and intricate legal questions which are bound to arise, may give you some idea of why there has been practically no general industrial financing, in which offerings were made to the public, undertaken since the passage of the Act. This has been quite generally attributed to the provisions for civil liability to a purchaser.

Under the Act a purchaser who had never seen a Registration Statement could recover for an untrue statement therein, regardless of the extent to which the untrue statement was responsible for his loss. Amendments are now proposed which will lessen this burden by requiring that the purchaser shall have relied on the statement, and limiting his damages to the actual loss by reason of the statement.

As the Act now stands, an underwriter is liable to all purchasers of the issue if the statement contains an untrue statement of a material fact, etc., but an amendment is now pending to limit his liability to that part of the issue which he may have handled.

The present act provides that those concerned in the issue shall not be held responsible for any statement of a material fact where they have reasonable ground for belief in the truth of the fact and had made reasonable investigations, but it fixes the standard of reasonableness as those required of a person occupying a fiduciary relationship. It is now proposed to amend the Act so that "the standard of reasonableness shall be that required of a prudent man in the management of his own property."

It seems evident from these proposed amendments that within less than one year, the Act has been shown to be entirely too drastic and has prevented the return of private capital to business. This undoubtedly applies as much to the financing of water works as to the financing of any other business, and capital which could and should have gone into further construction has either been entirely withheld or has been furnished by short-term loans.

The public service companies are not in a position to refuse, or to any considerable degree to postpone, capital expenditures. Continued extension and the upkeep of adequate service create a constant demand for capital by all public service companies, and this is believed to be particularly true in the case of water service where the demand of the public cannot be denied. It is of the utmost importance to the public that this new capital be secured with the greatest ease and with the lowest possible cost, since the cost of money has a direct relation to the rates to be charged. Anything which tends to prevent the ready flow of capital into the public service companies should be discouraged.

In the case of small companies, where the requirements for additions and betterments do not exceed \$100,000 per year, the Commission has adopted the suggestion contained in the Act and exempted them from registering the securities under certain conditions, the

main ones being that the aggregate amount at which the issue is offered, shall not exceed \$100,000, that no portion is to be sold other than for cash, that no securities of the same class have been sold otherwise than for cash within one year prior to the offering, that the net proceeds for all other securities issued within one year prior to the offering, together with the net proceeds to be realized from the issue then being offered, shall not exceed \$100,000, and that, if the distribution is through an underwriter, the net proceeds realized by the issuer shall be not less than 90 percent of the offering price.

Under this regulation it would be possible for the company to issue up to \$100,000 of securities in any one year, provided they were sold for cash and realize 90 percent of the price paid by the public. It is believed that the additions and betterments of the average company do not exceed 4 to 5 percent of its fixed capital account, so that this exemption might be availed of by companies having a fixed capital account of between \$2,000,000 and \$2,500,000, provided they could sell the securities for cash and net 90 percent of the offering price.

The Commission has made a further exemption of securities offered at an aggregate price of less than \$100,000 by providing that the requirement that no portion of the issue is to be put out otherwise than for cash shall not apply to any issue of stock where certain requirements are observed. The stock must be sold at par, unless it is reacquired stock; the amount realized by the issuer shall be not less than 75 percent of the price at which the stock is sold to the public and that a statement, somewhat like a prospectus, be given to the purchaser prior to the purchase, together with notice that the stock has not been registered with the Federal Trade Commission. This exemption relates to an issue of stock only, removes the limitation of requirements of cash sale and the limitation on underwriting expense, and may be of some assistance in the distribution of small blocks of stock.

The Commission has adopted a further rule by which stock to the amount of \$30,000, yearly, may be issued without registration, provided the total from all securities for any year is not in excess of \$30,000. It apparently applies only to an issuer who within the year has not issued \$30,000 of securities, or is not controlled by or under the common control of one who has realized from issues, including the one in question, \$30,000 within the year. It would, therefore, apply only to small and entirely independent companies.

The above exemptions may be a very great help to the smaller

companies of which there are a large number, but it is believed that they bring no relief to the larger companies which do their current financing by the sale of their securities through underwriters, or to their parent companies, which in turn sell their own securities to the public. The Commission has no power to exempt any issue in excess of \$100,000, and, as a general proposition, successful public financing, for any except local companies, cannot be handled in blocks of that amount. It is apparent, therefore, that any company which requires new capital, to be raised by a public offering of securities, in the sum of more than \$100,000 per annum, will be forced to issue them in accordance with the Securities Act of 1933, unless they can be sold without the use of the mails or of any form of transportation in interstate commerce.

When it comes to the refunding of outstanding issues, practically every company will have to comply with the Act. Whether the company is an independent one or is controlled by a holding company, the burden will be very severe.

If it is an independent company and has a plant value in excess of \$2,500,000, or even if it has a very much smaller plant value, it has probably been in existence for a great many years. Many water companies started over 75 years ago and few of them, of this size, have been in existence less than 50 years. In order to comply with the requirements of the Commission, it will be necessary for them to go back over their books from the very beginning with a fine-toothed comb, if they have complete books from the beginning, and to set forth in detail what the books show. Failure to do this might be construed to be the omission of a material fact necessary to make the statements not misleading.

For example, in my State, it was customary to construct water works under a contract which gave the contractor bonds of a face value at least equal to the cost, and certain amounts of stock. Variations of this method of financing were numerous and in a great many cases it would be entirely impossible to state now what the cost of the original construction was. In order to be safe, however, the company would have to explain the entire transaction, if it could, and make it appear in its darkest aspect, and even then, it might omit some material fact. This is true also with relation to extensions which have been made by consumers but are included in plant assets. Anyone familiar with the growth of water supply companies will realize, if he carefully examines the Registration Statement form, that a great

many of these companies would find it impossible to furnish the information desired and would have to go into lengthy explanations which would largely be based on surmises and which would lay the issuer open to the penalties of the Act.

The difficulties which would confront an operating company exist in the case of a holding company to a large extent, and in addition, it is compelled to furnish full information as to its own condition and its transactions with the subsidiary companies. If it has made any writeup of a subsidiary company, it must, to be safe, show it and explain fully why it was made what was the basis of it. It must detail its methods of consolidating accounts in a consolidated balance sheet, of estimating depreciation, and of the relationship of it and its directors and officers to the affiliated companies. In the case of the one Registration Statement filed, it was necessary to go back over the accounts of a predecessor company to the time of its organization in 1914, and it would seem that in order to be safe, a holding company might have to go into the accounts of all its underlying companies.

It is seldom that water companies, even holding companies which own only water supply companies, bring out issues in excess of five million dollars, even for refunding purposes. The expense of a million dollar issue would be just as large as that incurred in issuing five million, and in either case, would be a very decided burden upon the company and upon the consumers who, in the end, have to pay the cost of financing. In the case of water companies, it will be proportionately very much higher than in the case of electric companies, where the average issue is for a much greater sum. Likewise, in water companies it is believed that the information furnished will be less accurate and will be accompanied by reservations which will tend to disturb the reader of the Prospectus, if anyone except the banker ever reads it. In the opinion of the writer, the Securities Act of 1933 will have a very serious effect upon the financing of water companies, except the small ones, whether the financing is to meet the current needs of the company or to permit refunding.

The main purpose of the Act is, of course, to protect the investor, and no one would have any serious objection to a law which would accomplish this purpose. It seems that the present Act furnishes the average investor no assistance whatever in determining whether he will or will not purchase a security, since the average investor, if he reads the Prospectus, would not understand it. The information required in the Statement and the Prospectus is not designed to assist

a prospective buyer of a security. The act places an unjust and unwarranted liability upon innocent persons in favor of those whose damages have in no wise been caused by the acts of such persons.

The Securities Act of 1933 will be extremely burdensome upon water company financing where the funds to be raised exceed \$100,000. The fact that water company financing does not generally involve issues of very large amounts will make the burden proportionately heavier than in the case of other companies. The Act should be amended in its civil liability provisions, in the detail required in the Registration Statement, and in such a way as to make the Prospectus intelligible to a layman rather than to a certified public accountant.

EFFECTIVE PUBLICITY AS A MEANS OF ELIMINATING WATER WASTE

By H. L. MEITES

(Superintendent, Water Department, Chicago, Ill.)

Those who have followed the trend of the times can easily discern that it is becoming more and more apparent that all questions of import in this country of ours must be settled at the bar of public opinion. If our laws regulating large business concerns would provide for proper and comprehensive publicity, so that the labor of the concern would know what it is doing, so that the stockholder would know what is being done, and the public would have as much information as either—many of our present difficulties would disappear. In place of publicity being an element of weakness to a business concern, it would be an element of strength.

The same is true of a municipality. If the governing group would take into its confidence the governed, ask and get their coöperation, work together in harmony and with intelligent understanding, much good for all concerned would be accomplished.

I am a great believer in the power of the press and the efficacy of printer's ink, because I have come in daily contact with it during the past forty years. Some years ago I coined an apt phrase to which I am somewhat partial:

A drop of printer's ink
May make a million million think.

The power of the press is unlimited. It inspires the midnight toiler, weary at his loom, to lift his head again and gaze with fearlessness into the vast beyond, seeking the consolation of hope eternal. The press is the tireless clarion of the news. It cries out our joys and sorrows every hour. It fills the dullard's mind with knowledge and intelligence. It comes to us in the candle's glow, amid the dim lamps of poverty, as well as the splendor of riches. It is the voice of today and the herald of tomorrow. It weaves into the warp of the past, the woof of the future. It tells the stories of peace and war alike. It makes human hearts beat with passion and tenderness. It stirs the pulse of the nations and makes brave men do braver deeds.

The power of the press is limitless. The power of publicity is boundless; it is the backbone of progress and civilization. With the aid of publicity, properly directed, much good can be done and great things accomplished. It is unfortunate that executive heads of communities do not harness the power of the press to do its bidding in the interest of the citizens they serve.



S-L-I-P-P-I-N-G

through **YOUR** fingers ?

**LEAKY PIPES ARE AN
EXPENSIVE LUXURY**

**Keep your water Pipes
and plumbing fixtures
in good repair. Don't
waste money by wast-
ing water.**

Wherever publicity was used as a means of spreading light and knowledge it was always successful. Especially is that true in connection with communities who have applied printer's ink to come to their rescue when certain perplexing problems were to be solved.

Another important angle which is sadly neglected by executives in



$\frac{1}{32}$ inch
opening

$\frac{1}{16}$ inch
opening

$\frac{1}{8}$ inch
opening

$\frac{1}{4}$ inch
opening

$\frac{1}{2}$ inch
opening

DO YOU KNOW?

That High Water Bills
Are Usually Due to Leaks
in Your Pipes?

Wastes: 264 Gallons per day
7,920 Gallons per month
86,360 Gallons per year

And Costs \$0.57 per month
or \$6.91 per year

Wastes: 943 Gallons per day
28,290 Gallons per month
344,195 Gallons per year

And Costs \$2.29 per month
or \$27.53 per year

Wastes: 3,806 Gallons per day
114,180 Gallons per month
1,389,190 Gallons per year

And Costs \$9.26 per month
or \$111.13 per year

Wastes: 15,226 Gallons per day
456,780 Gallons per month
5,557,490 Gallons per year

And Costs \$37.05 per month
or \$444.59 per year

Wastes: 60,900 Gallons per day
1,827,000 Gallons per month
20,428,500 Gallons per year

And Costs \$136.19 per month
or \$1,634.28 per year

KEEP WATER-PIPES IN GOOD REPAIR AND SAVE MONEY.

A. J. CERMAK
Mayor

H. L. MEITES
Superintendent of Water

A. A. SPRAGUE
Comm. Pub. Works

STOP WASTING WATER! Keep your

public office, is the creation of public sentiment and the building-up of good-will which is so essential to the proper administration of their respective duties.

This is especially applicable to water—the most essential commodity in human endeavor, because it is used by every man, woman and child, and because there is no substitute for water.



CUT YOUR WATER BILL

*By keeping your water pipes
and fixtures in good repair.*

ELIMINATE LEAKS AND SAVE MONEY

*No deductions or adjustments
can be made for leakage.*

With the rapid increase of human knowledge and amid the growing complexities of modern life it becomes more and more difficult for the average man to know enough about his government to enable him to act intelligently.

It is an established fact that publicity brings rich returns to public utilities, railroads and similar corporations. Since the city caters to the same customers it behooves the progressive city official to use the same methods to the utmost, namely, to direct public opinion in a manner that it may become responsive and co-operative.



STOP WASTING WATER AND SAVE MONEY

The water closets may be out of repair and wasting water, either in the process of flushing or when not in use. The faucets in the sinks, wash basins, or bathtubs may not be shut off tightly. This wastes water.

Most of the complaints received by the Bureau of Water concerning excessive water bills are due to leaking toilets or faucets. Some toilets flush continuously, due to a leaky valve. This waste is at the expense of the consumer.

STOP WASTING WATER! Keep your plumbing in good repair; it will save you money.

Chicago is indeed fortunate in having at its front yard, so to speak, Lake Michigan, a huge body of clear water, which eliminates the need for bringing water from any distance. It is not wise to allow this good fortune to be used as an excuse for the profligate use of water—a waste



That slow but steady drip of water from faucets, wastes countless thousands of gallons of water daily and costs the taxpayers thousands of dollars annually.

Check up your faucets and see if they are in good order. If repaired, your water bills would be reduced considerably.

Don't Be a Water Waster!

amounting to half of all the water used. Considering the fact that it must be pumped, chlorinated and made germ free, water should be recognized as a manufactured product and should not be regarded as "free as air."

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good
waste

When I assumed my duties as Superintendent of Water, in June, 1931, I was amazed to find, upon a cursory investigation, that over 500 million gallons of water are wasted in Chicago every day; an almost unbelievable quantity, yet it is an absolute fact. My first efforts were to devise a method of operation of decreasing that abnormal waste. I also found that institutions such as churches, hospitals and schools, to whom the City of Chicago furnishes water free of charge, are perennial water wasters. Since it costs them nothing they allow the water to flow liberally.

The following appeared in the Chicago Daily News on January 15, 1933, which tells its own story most graphically and which created quite a stir throughout the city:

"YEAR'S SAVING OF \$912,000 IN WATER PUMPING COSTS AND COLLECTIONS REPORTED

A saving of \$720,000 in the cost of water pumped and of \$192,000 in the cost of collecting water bills is reported by H. L. Meites, Superintendent of the city Bureau of Water.

'How did you save that 9,000,000,000 gallons of water in 1932, mentioned in your annual report to Mayor Cermak?' Mr. Meites was asked.

'The people saved it for their city as a result of our campaign of education,' replied Meites. 'Part of the thousands spent for mechanizing the water office went into a printing press on which we print the water bills. On the reverse side of each bill we print a cartoon showing the people how to save pennies and dollars by keeping their plumbing repaired. This printing costs the city practically nothing and has been effective in teaching the people to save water.'

'We have metered every one of some 500 churches, schools, asylums and hospitals, which are granted free water by city council order. We have been sending a bill to each every month and enclosing a request that the institution, in accepting free water for the city, avoid wasting water.'

Here Meites stepped to a cabinet and drew out a sheaf of several hundred letters from heads of institutions promising to coöperate with the city.

'We saved \$192,000 on the office work after deducting the cost of new bills and printing machines, new filing systems and what not,' he added. 'And while the business of handling water accounts cost \$905,000 in 1932, we have asked for only \$279,479 for 1933. In the old days they spent more than \$1,000,000 a year.'"

I began a systematic campaign to eliminate this waste of water. My next step in that direction was a series of radio talks in which I stressed the point that waste of water is waste of taxpayers' money. In these radio talks I sought to impress upon the public that it was not desired that anyone should eliminate the legitimate use of water,

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but to use all the water they need and not waste it. The slogan adopted for the purpose was:

"USE ALL THE WATER YOU NEED, BUT DON'T WASTE IT—THERE IS NO SUBSTITUTE FOR WATER."

These talks created considerable comment as it was new and surprising to the citizens of Chicago that half of its water supply is being wasted for no good reason at all, and a large number of inquiries came in as to what must be done to eliminate that waste. The answer, of course, is meterization. Chicago is, at present, only one-third metered. Out of 450,000 accounts only about 125,000 are metered, the rest being charged on a flat rate basis.

The next move in our campaign was the purchase of an addressograph machine which prints the bills on both sides in one operation, giving us the opportunity to print messages on the backs of the bills which were formerly blank, bringing home to the customers of the Bureau of Water the importance of eliminating waste by keeping their plumbing in good repair. Every bill has a different message. This method too brought splendid results.

With the closing of a number of neighborhood banks in Chicago, thousands upon thousands of citizens now come direct to the Bureau of Water to pay their bills. We have a fine exhibit in the office where the people are bound to see it, stressing the importance of water in the make-up of our every day life—in fact, our very existence. One is a drawing, artistically illustrated, and contains the following legend:

"NO WATER?"

If all the faucets at one time ceased to give forth water, the whole structure of civilization would crumble. Within twenty-four hours armies of men, women and children would abandon all their possessions, everything—shelter, food, clothing, property, and would go groping through the night, sniffing for, searching, listening for the sound of water.

Water, without you, life cannot exist.

Use all the water you need—but don't waste it!

THERE IS NO SUBSTITUTE FOR WATER."

We also have an exhibit showing what a plain, ordinary, every-day leak at a faucet will do to a man's water bill. We have a chart in front of a specially arranged leaking faucet dropping water into a three-gallon container, showing how costly such a leak is if allowed to continue for any length of time.

That, too, brought many inquiries and grateful appreciation from those who have benefited by this exhibit.

Along this line to reduce waste we have made use of Uncle Sam in connection with the printer's ink.

Before my advent into office, when a water pipe or fixture had sprung a leak no one was the wiser. The Bureau of Water continued sending bills which increased month by month and the property owner paid, often under protest, without knowing the cause for the increase. I have installed a very simple procedure which has proven most satisfactory. When the entry clerk sees an increased consumption he immediately sends a post card to the property owner which reads as follows:

"BUREAU OF WATER, CITY OF CHICAGO

LARGE CONSUMPTION NOTICE

"Please be advised that our Meter Reader called on premises _____ and found the meter registering continuously. This is an indication of leakage due to defective plumbing, wastage, or carelessness. In either case you should investigate and remedy it *immediately* or your water bills will continue to increase. *An ounce of prevention is worth more than a pound of cure.*"

I found that the laundries are large consumers of water and every time they paid their bill they voiced a vociferous complaint about being robbed because their bill is too high. Of course, I realized that this was more or less true, but I knew that it was due to useless waste of water. I supplied them with cards which read:

"DON'T WASTE WATER

Turn off faucets when not using.

In some instances the waste often amounts to two or three times the quantity of water really needed.

Water leaks make large water bills."

I found the cosmopolitan press ready and anxious to co-operate to the fullest extent. Anything that has news value finds the newspaper a willing recipient. But I found one discouraging factor in the entire publicity idea and that is that one must continue to hammer away at all times. If one should let up, interest wanes and the people lapse back into their old ways of wasting water as if nothing had happened.

Make your story as simple and graphic as possible. Leave nothing to the imagination because imagination is a fickle mistress. She is not reliable. To each one she appears in a different guise.

SUPERINTENDENTS' ROUND TABLE DISCUSSION

FIRE HYDRANTS IN COLD WEATHER

C. A. HECHMER (*Hyattsville, Md.*): In the Washington suburban area where I am from when it gets a little below zero we think it is terribly cold. But we have prided ourselves on the thoroughness of our fire hydrant inspection. We thought we were pretty good. About two o'clock one morning a fire occurred in a very small house occupied by a man and his wife and two small children. It was just a one story affair, hardly larger than the ordinary garage. Probably his intention was to build a house later on when he could afford it and meanwhile build a home that he could use for a garage in later years. It caught fire about two o'clock in the morning and the fellow next door discovered it and phoned in an alarm. He did not have a phone in his house and he had to go somewhere else. There was quite a lot of delay. We have a volunteer fire company, so there was just a little more delay compared with the ordinary city fire departments. When they got to the fire, which was several miles away, the house was totally in flames. No one had escaped from the house.

Until the next morning I did not learn of it, but then I was called on the phone by a newspaper reporter who happens to work for the newspapers that we all know love black headlines. He said he understood that four people burned up last night in my area because the fire department did not have any water. I was very much surprised, worried and concerned. I immediately went to the fire department, not even knowing the location. There I met the chief and several of the volunteers who were just cleaning up from their night's work. He said that it was true they could not get the fire hydrant open. I asked him if he would mind showing me that fire hydrant. I assumed that his men did not know how to turn on the fire hydrant.

We went to the fire hydrant and the temperature was still below zero. It was a cloudy day and there had been no thawing in the meantime. I opened that hydrant without any effort. I first tapped the top of it. The firemen had been instructed to do this several times, but the man that usually looked after the fire hydrant over-

slept himself that night and missed the fire engine. One of the other boys, with all due respect to those volunteers, was untrained and he put the wrench on top of the hydrant and gave it a yank and the hydrant wrench broke. Of course, metal will sheer in very cold weather.

The fact that the fire was about 1200 to 1500 feet from that fire hydrant and that the engine was carrying 500 feet of hose never came out in the paper. I spoke to the plug man who usually takes care of the turning on of the water in the department and he told me that he missed the engine. I spoke to the driver and asked him what the story was and asked him if they had laid out the hose. He told me that they had started to lay out the hose, going about their work, but they came back to the plug and saw that the wrench was broken off and as they did not have enough hose anyway, they just took up their hose and put it back on the apparatus.

What happened to this fire hydrant was that the condensation in the stuffing box had caused the stem to become stuck. I do not know of any stuffing box that will not cause that same trouble. But there was no negligence on the part of the water department and there had been good inspection all the time. I am afraid that the inspection previous to the cold weather had caused additional condensation to get into the stuffing box and may have aggravated rather than prevented the trouble. The hydrant was properly installed and it was a good make. In previous years we know that when the steamer fire engine was used it was usual to shoot a little steam into the hydrant before they turned on the water to overcome that condition, but the use of the gasoline driven pump has eliminated that method of opening the hydrant. We have never found a hydrant that we could not open by just tapping the topnut with the hydrant fire wrench and jarring it loose.

The afternoon paper, however, came out with the big black headlines: "Four People Die—Firemen Unable to Open Fire Plug—No Water Available." There was a case where there was absolutely no negligence on my part. We cannot criticize too much the volunteers, the boys who go out on these volunteer fire engines, at no pay at all. They are doing a much better job than none at all. We had a good fire hydrant and it was well inspected and in good condition. Nevertheless that situation occurred and it certainly was serious to me and all efforts to have the same black type used to present the facts bore no fruit.

MR. MACLEAN (*Cold Water, Michigan*): One thing that might be of interest to the small town operators, where you have the volunteer fire department is to have an employee of the water department, or a couple of them, on the fire department.

CHAIRMAN HECHMER: That is a mighty good idea in most cases, but unfortunately I do not believe that it would work in our case. We are governed by a Commission, somewhat unpopular in certain localities, as are most Commissions who have to collect revenue. There was a rumor that this Commission, having secured control of the water and sewerage facilities, would soon secure control of the roads and streets and everything concerned with the several municipalities which our district includes, to the end that the volunteer fire department, after all their efforts to secure their expensive apparatus, and they do have very good apparatus, would also come under our control. Having the idea that we are also going to control the fire departments they are, therefore, rather reluctant to allow any of our employees to come within the confines of the fire house or belong to the Association.

I found that out, to my sorrow, when I attempted to contact all of them in a friendly way, so as to coöperate for the benefit of the general public, in going to their meetings, carrying along a little model fire hydrant and explaining its operation, and trying to explain some of the hydraulics of hose lines and connections. Operating a hydrant is a mechanical operation and I wanted them to have a better understanding of it, so that they would be able to overcome the difficulties that might face them sometime. But their attitude, even under those circumstances, was rather discouraging, although we are, personally, on rather good terms.

Many times volunteer companies have the idea that the town is trying to get control of the fire department and there is some friction that does not make for proper coöperation and the public suffers for it. For instance, in our area every little town has its own fire department. They have remarkably good apparatus which the people have paid for. It has come out of their community in one way or another, but the firemen are all volunteers and insurance rates are based entirely on full volunteer companies.

W. S. PATTON (*Ashland Water Works, Ashland, Ky.*): One morning the Fire Chief told me that they had had a fire on one of the hill tops and that they could not open a fire hydrant.

I drove out to the hydrant and opened it without any difficulty. The hydrant had never been frozen and I never have been able to understand why they could not operate it. The strangest experience I ever had happened one night about twelve o'clock. One of the firemen telephoned that there was a big fire downtown and that they were unable to open one of the closest hydrants. I drove down as quickly as I could and asked for a hydrant key. They gave me one and I opened the hydrant without any effort at all. All of our hydrants open to the right and this fireman had been trying to open it to the left. Evidently none of the other firemen had tried to operate it.

ADJUSTMENTS IN WATER BILLS

W. S. PATTON (*Ashland Water Works, Ashland, Ky.*): Taking a hypothetical case, our consumer comes into the water works office with a bill three or four times as large as the average. To her knowledge there has been no leakage in the plumbing. Every care has been exercised in the use of water and she wants to know what we can do about this large bill because it is more than she can afford to pay.

At our plant we first make a careful check. We get another reading of the meter and we watch the test hand on meter while all outlets are closed. After satisfying himself that there is at present no leakage, our investigator questions some member of the household to ascertain whether any repairs have been made in the plumbing. Suppose that he finds no evidence of leakage and no plumber has been called in recently, then he examines the water closets, flushing each closet a number of times to make sure that the valve closes each time. Often he will find a water closet that shuts off most of the time, but sometimes fails. I recall an instance of this kind that was related to me by the late W. S. Cramer. He had sent an inspector to the residence of one of his consumers to make an investigation. He could find no reason for the large consumption of water at this house, but, being a thorough investigator, he flushed the water closet ten times. On the tenth time the valve failed to close so he was able to find the reason for the large consumption. There are not many men as thorough as this one, however.

If we can find the cause of excessive consumption, the consumer is generally willing to pay the bill, but it sometimes happens that the consumption is abnormally large, and yet there is no apparent reason. In cases of this kind, the consumer should be required to pay the bill. In cases where water has been lost by underground leakage,

and where the consumer was not negligent in any respect, then an adjustment should be made in the amount of the bill.

Great care should be exercised in authorizing reductions in water bills. I have always thought that underground leaks were the only kind that should entitle consumers to a reduction, but it sometimes happens that a consumer will unwittingly incur such a large bill that it becomes an unbearable hardship. In cases of this kind some kind of relief should be available.

The Cincinnati Times Star of March 16, 1918 carried an account of one John Dremmel, 5023 Ward Street, Madisonville, who appeared before the Board of Directors of the Cottage Building and Loan Association in Madisonville and asked for an additional loan on his home in order to pay one months water bill on his home, amounting to \$52.60. The bill seemed so large that the Directors called up the water works office and were informed that the matter had been investigated in an attempt to find some way out of the predicament for Dremmel, but the close supervision of the accounting department made it impossible to help him. Dremmel said that there had been a leak in an outdoor hydrant but that it was not discovered until after the extreme cold weather had passed.

It is difficult to make a rule that will fit all cases, but relief should be possible for those exceptional cases. The safest way is for the Superintendent to arrange for the consumers to appear before the water works commission or governing board. It is unwise to delegate to the superintendent the power of authorizing reductions, where negligence has caused distress, because if the consumer knows that the superintendent has the power to reduce his bill, it is hard for the superintendent to say "no." If he makes very many reductions he may be charged with discrimination.

In cases where water is lost through underground leaks, and where the consumer was not negligent, or where the consumer had no way of knowing that the leakage was taking place, the Superintendent should have the power to make an adjustment, *provided that he has thoroughly investigated the circumstances.* A fair charge could be arrived at by charging the consumer an average bill, plus the difference between his average consumption and the amount consumed at a nominal charge per thousand gallons. This nominal charge per thousand gallons might be fixed at twice the cost of pumping and filtering. Under this plan the utility could not suffer any loss while the consumer would be relieved of a heavy burden.

There is no question but that some provision for mercy will result in building up a better understanding between the plant and the public. It is a friend maker and friends are necessary to our business. Many a plant has gone through expensive litigation that might have been avoided had it not insisted upon its pound of flesh.

C. M. CROWLEY (*St. Paul, Minn.*): Rules of our Department requiring all water pipes to be laid 18 inches under floor to second stop at riser were adopted largely on a flat rate system. About 20 years ago it was decided to meter all services. They are now 99½ percent metered. Rules were amended to permit meters to be set on or above the floor. About 60 percent of services remain underground. In some soils (sand and gravel) a leak underground will not show on the surface unless it is a bad one. Consumers were thereby made defenseless by rules of the Department.

After long deliberation by the Legal Department our Board passed a resolution allowing a 50 percent deduction on all quantities *in excess of normal*, thus sharing in the consumers' distress instead of profiting by it. It has worked very satisfactorily. The repair, however, must be duly reported by a licensed master plumber approved by a department inspector, Registrar and general superintendent. Attempts to put it over have been remarkably rare.

Another check is made on the meter reading sheet. Ninety percent of them are so reported and a written notice is left with the owner allowing 5 days for repair. That notice is also left for all leaky fixtures found over the floor. In a four-month period 750 leaks of all kinds were reported, 660 of them in toilets. With these precautions most consumers come in to thank the department instead of complaining.

J. B. EDDY (*Chicago, Ill.*): There is another kind of adjustment. We can reduce the bill to the ordinary size, if possible, but in Chicago, especially during the depression, there has been a racket going on in industrial plants, especially in laundries, where some person representing himself as an inspector comes in and breaks the seal reverses the gears and reseals the meter, representing that the water department is making an adjustment to the meter. In this case the adjustment fits on the other foot and a back bill is rendered. In the past ninety days we have made recommendations to the collecting agencies that they collect on those.

Where the ordinance allows it, in the ordinary case, it is better to make an adjustment, for there are many different things that enter into it, but it all depends on the circumstances with which you are faced in each case.

R. G. YAXLEY (*Waterford, N. Y.*): We lose the efficiency of the metered system if we make adjustments, with this possible exception: if we make a practice of metering at the curb I realize the advantage of an adjustment. You hardly could hold a property owner responsible for leakage underground between the curb and the house, because he does not know anything about the water business. If you meter in the cellar you are up against it if you start to make adjustments.

I follow Mr. Patton's example in making a personal examination of all leaks. If we have a high bill we send the meter reader back to check it up. In regard to the meter being reversed, if there is a low bill, we send the meter reader back just the same as if there were a high bill. There was a case where a man and wife were both in business and only spent the nights at home. Their total bill was \$45, or \$50 for five years and they had no minimum charge. He came up with a bill for one quarter of \$50. He had a service line between the house and the garage and the plumber told me about a leak on the line that ran out there, but this man had told him to let that go, because he thought that the plumber was trying to put something over on him. He appeared before the Commission and in the end he paid the \$50, thanked me for my courtesy and gave me a cigar.

RECONDITIONING OF MAINS

William W. Brush outlined some of the experiences of the New York Water Department. Cleaning of mains has been effective, but the results have not proven permanent, particularly in the case of small mains where it is impossible to treat the inner surface after cleaning. With larger mains the experience has been better, for in this case men can get within the pipe to give the pipe a coat of protecting paint after cleaning has been completed.

In order to determine whether the thoroughness of cleaning has any bearing on the lasting quantities of the paint applied to the inner surface after cleaning, sections of pipes were cleaned by sand blast and by the use of wire brush. The former method is much more thorough, for a bright, clean metal surface is provided by the sand blast; the latter method does not produce as good a result, but it is

much cheaper. Both types of surfaces were treated with bitumastic enamel and the results showed that there was no difference between the adhering quality of the paint on the perfectly and on the imperfectly cleaned surfaces. Mr. Brush believes it is a profitable operation to clean and recoat large mains. Some method of cement lining pipe after cleaning should be developed to make possible the protection of small sized pipes, which are too small for workmen to get into. He suggested a machine which might be passed through a pipe line, working possibly 100 foot lengths at a time, and apply a cement coating to the inside of the pipe. Immediately after the application of such a coating the services would have to be blown out to remove any cement which had lodged therein at the point of tapping into the main.

Where valves were encountered, he suggested making cuts near the valves so that they could be protected by a hand applied protective coating.

F. C. Hopkins, of Utica, described the cleaning of a 24-inch pipe line, and expressed the belief that the subsequent use of the ammonia-chlorine treatment proved effective in checking tuberculation. As a matter of fact, the coefficient of the pipe line seemed to increase subsequent to the application of ammonia-chlorine.

A member described a process developed in Great Britain for lining pipes too small for workmen to enter. After a pipe line is cleaned, an emulsion of asphalt is flowed into the line and an electric current is applied. The electric current causes the asphalt emulsion to form a thin coating on the inside of the pipe. As the asphalt is an insulator, the flow of current indicates the time when the inside surface of the pipe is fully coated. Due to the fact that it requires only a very thin coating of asphalt to check the flow of current, the thickness of the coat is consequently very small. For this reason, the period such a coating would stand up is problematical.

TASTE AND COLOR TROUBLES IN DEAD-END MAINS

Malcolm Pirnie pointed out that the presence of taste and odor, as well as color, are symptoms of trouble in the plant. He called attention to the advances made, particularly in the application of the ammonia-chlorine process, which has proven quite effective in checking such troubles. This problem is usually associated with soft water supply, and in one instance cited by Mr. Pirnie the use of lime prevented the growth of tubercles. In dead-ends there is still a

tendency for this condition to continue. A bleeder pipe has been used in some sections on dead-ends, but this can only be considered a temporary remedy, due to the wasting of water through the pipe. Mr. Pirnie described tests conducted at West Palm Beach, Fla., where a variety of paints were used on strips of metal in a tank which was filled and syphoned off one-half twice a day. From data secured, the evidence seems to indicate that biological growth causes tubercles. He expressed the belief that if ammonia-chlorine mixture coursed throughout the entire water system, it might prove a cure for dead-end troubles.

M. C. Smith, of Richmond, Va., reported that his department had had a lot of trouble with dead-ends, but since the use of the ammonia-chlorine process the quality of water in dead-ends has improved markedly. He felt that if the food supply of the bacteria were removed, a big step would be made in stopping dead-end troubles. The removal of food supply would require thorough purification.

A member called attention to his observation that tuberculation increases with the depth of water and with increase of darkness, explaining the greater growth of tubercles in the lower part of a water tank.

In answer to a question by a member as to how to prevent the tremendous increase in alkalinity subsequent to the installation of cement lined pipe, W. W. Brush said that coal tar and asphalt coating over the surface of the cement lining would prevent increase in the hardness of the water. Only a thin coating of asphalt or coal tar is required over the inside surface of the cement. In New York City the paint employed is tested to insure that no taste or odor will be imparted by it to the water.

ENAMEL LINING FOR CAST IRON PIPE

This discussion was led by L. P. Wood, Engineer, Department of Water Supply, New York. Mr. Wood first described the difference between bitumastic enamel and vitreous enamel, the latter being far too expensive for use in water mains. In 1914 and 1915 the first lining of bitumastic enamel was applied in the water mains in New York. It has been in use since with very satisfactory results. The present standard of thickness in New York is $\frac{1}{16}$ -inch. In applying the enamel a priming coat is first put on. Then the enamel is spun on the inside. The pipe sections are painted on the outside with whitewash so that if the pipe should be stored in the sun, the white

surface will reflect rather than absorb the heat of the sun's rays, and thus subject the lining to less severe temperature.

J. Walter Ackerman described a pipe line at New Bedford, which he inspected a few years back. The pipe line was laid, but was not covered over or filled with water over the winter. The lining began to drop off in pieces. The cause of this was explained by the manufacturer as being due to an imperfect blend of the enamel, and the fact that the pipe remained dry through cold weather.

In answer to a question as to the method of making taps, one of the delegates who had had considerable experience in this work reported that the tap leaves a clean hole where it punctures the lining. The lining may first appear to rise as a large blister, as the tap comes through, but shortly after this first evidence of the appearance of the tap, the tap breaks through the lining, leaving a clean hole. Also, when making cuts with a pipe cutter, the enamel breaks even with the end of the pipe, and gives the appearance of having been thawed.

It was reported that there was apparently no taste or odor in water in dead-ends lined with this enamel.

RUST AND MILL-SCALE ON ELEVATED TANKS AND STANDPIPES

J. E. Gibson said that it is best to clean the surface of a tank, removing all mill scale before painting. It is good practice to let the plates or the completed tank stand and rust before painting so that the mill scale will drop off. This would eliminate the shop coat of paint usually applied by the builder.

As to painting standpipes, on the outside he applies red lead and oil and then aluminum over it. On the inside bitumastic enamel is put on by hand. After eight years of service in one tank, the paint is still in excellent condition. On a wrought iron tank, which was erected originally in 1880, then cut down and removed in 1920 and re-erected, red-lead and pigment was applied. It lasted for four years. The inside of the tank was badly tuberculated. Where aluminum paint was applied there was no tuberculation whatever.

A rather amusing experience occurred at Charleston when the department tried to raise the pH of the water supply 9.8. The water at Charleston is very soft and during the attempt to elevate the pH, when it reached 9.4 there was a rush of complaints from bakers, who complained that the water affected their yeast. At first it was thought that the complaints were unfounded, but upon investigation it was learned that yeast to grow best requires a pH

in the water used of 7.2 to 7.4. A rapid increase in pH inhibited the growth of the yeast and resulted in the complaints referred to. Carl Hechmer related similar trouble in his territory, where home manufacture of brew was interfered with by a high pH in the water supply.

Mr. Hechmer said, in connection with painting of tanks, that he believes in letting the tank plate weather for six months before painting. Such a procedure improves the results.

LARGE UNPROTECTED RISER PIPES VS. SMALL PROTECTED RISER PIPES FOR ELEVATED TANKS

The consensus of opinion in this discussion was that the large unprotected riser is better than the small protected riser. As one manufacturer's representative summed it up, one-sixth of the tank load is supported by the riser in large tanks, hence the large steel riser serves a double purpose. Not only does it safeguard against freezing, but it serves as a supporting member in the tank construction.

One of the unusual troubles encountered with the protected, small riser, where the riser is boxed in with boards, is the tendency of wood-peckers to mutilate the cases. Annoyance to residents located near the tank from this source added to the trouble.

Mr. Hopkins said that a 6-inch protected riser was used on a small tank at Utica, and the cost to the water company of keeping the riser in service over a period of years was almost as much as the cost of the tank.

Mr. Hechmer reported woodpecker trouble with riser casings and found that the only remedy was to cover the riser with tin.

SPECIAL WATER RATES FOR SPRINKLING

R. B. Simms, of Spartanburg, S. C., recommended to his Commission that a summer sprinkling rate for Spartanburg of 10 cents per 100 cubic feet net, or 13.3 cents per thousand gallons, be established. This rate would apply only on the additional amount of water used by the consumers above that used during the winter months; that is, an average of winter month's consumption would be the limiting quantity above which the lower rates would be effective. The idea in mind was to give a discount of approximately 50 percent on water used for sprinkling, but the figures above were chosen for simplifying bookkeeping operations. In recommending the rate, the following reasons were given: because there have been many requests for rate cuts from the consumers; because at the present time the

local Water Department is spurred by competition or comparison, for a neighboring city near Spartanburg has already announced a similar scheme.

The planned method of separating the ordinary consumption of the consumers from the additional sprinkling consumption is to average the number of cubic feet of water used during the four winter months, then use that quantity as the minimum for a bill. To this the department would add the excess usage of water at 10 cents per hundred cubic feet.

The plan proposed by Mr. Simms was widely discussed. Mr. Gibson felt that the element of discrimination might enter into such a plan, for the consumer who used a small amount of water during the winter months would get a more advantageous rate on his total consumption if his summer consumption was heavy. Mr. Ackerman's objection to the plan was that it would increase the use of water when the supply is normally low and the consumption heavy.

Mr. Wilson compared the Simms' plan with the promotional plan followed by electric utilities, where a special rate is made for current for some particular use, such as cooking, refrigeration, etc.

In New York, Mr. Brush pointed out, the period of greatest consumption was from 4.30 to 7.30 at night, and if excessive sprinkling was encouraged it would impose a severe burden upon the Water Department. In fact, to decrease the use of water for sprinkling purposes, New York requires that the hose be held in hand when sprinkling and that no fountain sprinklers be employed. He held that the increase in revenue would not compensate for the greater burden on the department.

W. V. Weir said that the promotional rate given by power companies for the operation of electric refrigerators did not compare with a special rate for the use of watering sprinklers, for electric refrigerators use power twenty-four hours a day, while sprinklers are employed over a period of but a couple of hours.

CONE VALVES AND WATER HAMMER

E. C. Brisbane, of S. Morgan Smith Company, outlined the advantages which are characteristic of cone valves, particularly in connection with systems where centrifugal pumps are employed. The cone valve reduces the flow in parabolic proportions, eliminating or greatly reducing water hammer. Mr. Nelson of Chicago, reported using cone valves for five years with very good results. He found

that they are suitable for use with check valves, altitude valves and for other purposes. He has found that they greatly reduce, although they do not entirely eliminate, water hammer.

J. Walter Ackerman described an installation in the New England section of the country where one 8 million and one 13 million gallon pump in a pumping station supplied two pipe lines, branched a short distance from the station from a single line. One of the mains, a 24-inch, fed two standpipes in a section of the city.

The pump drive was changed from steam to electricity and shortly after electrification a branch of a tree, broken off during a storm, fell across the power line, caused the circuit breaker in the station to blow and a heavy surge was created in the 24-inch line. The tee near the station was blown off.

A cone valve was put in service at the station, and timed carefully so that there is practically no water hammer when there is a rapid shut down on the line. No trouble has since occurred.

S. Logan Kerr, of the Baldwin Southwark Corporation, pointed out that conditions vary with the locality. For example, where pump discharge lines furnish an area where there is no elevated storage, there is less surge than in the district where elevated storage tanks are connected to the system. In the latter case, there is a more vigorous reversal of flow and hence the hammer is more severe. In the New York system a relief valve is in service which opens in reverse order; in other words, it operates on the down surge, which is in advance of the pressure wave. Thus the relief valve has opportunity to open and function by the time the pressure wave, or surge, arrives. He called attention to the fact that emergencies cause the most trouble, for instance, where there is power failure or pipe line rupture.

W. W. Brush discussed the operation of the cone valve at the Ridgewood pumping station in Brooklyn, where the pressure rises only a few pounds upon operation of the valve. In this particular section the flow is 25 million gallons per day, delivered by centrifugal pumps. He also discussed the importance of savings due to the use of proper types of valves.

FIRE HYDRANT PAINTING

Ross L. Dobbin, in opening this discussion, expressed the opinion that fire hydrants should be painted once a year, and that it was a question of appearance rather than protection which determined the frequency of painting. In his section of the country, no standard system of colors is employed.

An electric spray painter was employed for a while, but it did not prove satisfactory, due to the paint reaching points at which it was not desired.

C. W. Mowry, of Boston, said that the purpose in painting hydrants different colors was not generally understood. In the New England section of the country the color of the hood, or top, of the hydrant indicates the supply of water which may be expected from it, while the body of the hydrant may be of one standard color, such as yellow. For example, if the hydrant cannot be expected to give more than 500 gallons per minute, then the cap, will bear one color; if it can give from 500 to 1,000 gallons per minute, another color is used on the cap; while if it can be called upon for more than 1,000 gallons per minute, still a third color is employed. This method of marking has been approved by the New England Fire Chiefs Association as well as the New England Water Works Association.

Carl Hechmer explained the color scheme employed in the Washington Suburban Sanitary District. Light gray is used for the barrel while dark green is employed for the top. The gray matches the color of the concrete sidewalks and is not too conspicuous in residential areas, while the green cap blends with the color of the foliage in the neighborhood.

W. W. Brush stated that New York used black paint for the hydrant barrel and aluminum for the dome. The barrels are usually painted every five years and the domes every two years. Members of the Fire Department paint the size of the main, to which the hydrant is attached, on the base of each hydrant, to guide the Fire Department. It costs about 30 cents per hydrant, by contract, for painting in New York. In the theatrical district the hydrants are painted yellow, to make them more conspicuous and thus prevent parking of cars alongside.

Several of the members reported using DuPont Du Lux paints, especially for hydrants, with very satisfactory results.

Those in the North favor the use of chains to prevent loss of caps when Fire Departments use the hydrants in snowy weather; also they feel that the chains would prevent grit from entering the hydrant by means of caps when the caps are laid on the ground and subsequently put into position on the hydrant.

On the other hand, those who do not employ chains report very few of the hydrant caps lost.

R. W. Esty reported that Danvers, Mass., employed yellow for

painting hydrant barrels and with good results. Different colors are used in painting the tops of hydrants to indicate the capacity. Red tops are employed where the supply is poor or where water hammer might be caused by quick shutting off of line. He suggested that the Water Department send a man to each fire to coöperate with the Fire Department in operation of hydrants.

was approved in 1923 by the Committee on Water Works Practice and published in the Journal of March, 1923. The Committee now presents a brief description of the types of cross connections which were involved in an outbreak of amebic dysentery at Chicago; a brief history of the regulations enacted, enforcement activities and experience during the past two years; and conclusions based on these incidents. A bibliography of recent cross connections in Illinois is appended.

CHICAGO ROYALTY COMPANY IS OUTRAGED BY BREWERY DEPARTMENT
AT CHICAGO, ILLINOIS

The outbreak of cross connections in early building piping was called promptly to the attention of health and water authorities by a serious outbreak of amebic dysentery at Chicago in 1923. A full account of this unfortunate occurrence is given in a paper presented to the Association at the New York City convention (1924) by Mr. John I. Connelley, Chief Bureau of Public Health Engineering, Board of Health, Chicago, and by Mr. Arthur H. Starnes, Engineer in Charge, Bureau of Engineering, Chicago, entitled "Significant Features of the Chicago Amebic Dysentery Outbreak."

The outbreak was among the guests and employees of four hotels and up to June, 1924, 830 cases of amebic dysentery and 23 deaths had been reported. An examination of the food handlers of the hotels indicated that they were not responsible for the outbreak. A detailed study of the water and sewage systems of both hotels revealed a number of defects which are being corrected and continued to the present.

One of the defects reported water from the Chicago Public Health and Health Department in the summer of 1923 as well as the upper part of the water for amebic dysentery, pointing to the fact that the type of bacteria found. The first outbreak of amebic dysentery between water and waste flow. The second outbreak was a result of a connection from the sewer system to the water supply.

REPORT OF COMMITTEE NO. 8 ON CROSS CONNECTIONS

Committee No. 8 presented to the Association at Memphis, on May 2, 1932, an exhaustive report on cross connections. This report was approved in 1933, by the Committee on Water Works Practice and published in *The Journal* of March, 1933. The Committee now presents a brief description of the types of cross connections which were involved in an outbreak of amebic dysentery at Chicago; a brief résumé of new regulations enacted, enforcement activities and experience during the past two years; and conclusions based on these incidents. A bibliography of recent cross connection literature is appended.

CROSS CONNECTIONS INVOLVED IN OUTBREAK OF AMEBIC DYSENTERY AT CHICAGO, ILLINOIS

The hazards of cross connections in faulty building piping were called forcefully to the attention of health and water authorities by a serious outbreak of amebic dysentery at Chicago in 1933. A full account of this unfortunate occurrence is given in a paper presented to the Association at the New York City convention (1934) by Mr. Joel I. Connolly, Chief, Bureau of Public Health Engineering, Board of Health, Chicago, and by Mr. Arthur E. Gorman, Engineer of Filtration, Bureau of Engineering, Chicago, entitled "Significant Features of the Chicago Amebic Dysentery Outbreak."

The outbreak was among the guests and employees of two hotels, and up to June, 1934, 850 cases of amebic dysentery and 52 deaths had been reported. An examination of the food handlers of the hotels indicated that they were not responsible for the outbreak. A detailed study of the water and sewerage systems of both hotels revealed a number of defects which are believed to have contributed to the outbreak.

One of the hotels received water from the Chicago public mains and distributed it throughout its own premises, as well as the upper part of the other by supplementary pumpage to roof tanks. Three types of sanitary hazard were found. The first consisted of cross connections between water and sewer lines. The second hazard was a sewer pipe suspended from the basement ceiling directly above

a tank in which city water was cooled and then pumped to the upper floors. The sewer pipe was not tight and leakage from it could enter the tank through a loosely fitting and defective cover. The third hazard consisted of old piping layouts which made it possible to syphon water from bathtubs and flush toilets into water lines.

REGULATIONS ENACTED

Province of Quebec. On April 15, 1933, Article 56 of the Quebec Public Health Act was amended to include regulations relative to cross connections. No cross connections can be made between public and private water supplies before submitting plans and specifications to the Director of the Provincial Bureau of Health and obtaining his approval. The amendment also requires that "Plans and specifications of existing cross connections shall be submitted to the Director of the Bureau before the first of January, 1934. These cross connections shall be modified or eliminated when, in the opinion of the Director, they constitute a danger to the public health." There has, however, been little enforcement of this cross connection law, due to lack of funds.

City of Montreal. On October 11, 1932 the City Council of Montreal enacted a by-law concerning the water supply of establishments within the city. The by-law aims to eliminate cross connections wherever possible, but makes provision to continue existing cross connections temporarily, at the discretion of the Health Department, if made through properly installed and adequately supervised all-bronze, rubber-seated, double check valves. The by-law is being actively enforced.

So far as known, no state has adopted cross connection regulations since May, 1932.

ENFORCEMENT EXPERIENCE AND ACTIVITIES

Information regarding the experience of several state sanitary engineers, who have been active in the enforcement of cross connection regulations has been received.

Connecticut. Regulations relative to cross connections were enacted by the State Department of Health of Connecticut in 1926. Mr. Warren J. Scott, Director of the Bureau of Sanitary Engineering of the Department writes as follows:

"The situation with regard to cross connections in Connecticut remains unchanged except that we now inspect existing check valve installations three

times a year instead of four times a year. When a valve is found leaking, it is immediately opened up and repaired. Once a year we require that all check valves be opened up and overhauled. No new check valve installations are permitted."

New York. Regulations of the New York State Health Department were passed in 1925 to 1928. Information from Mr. Earl Devendorf, Associate Director of the Division of Sanitation is as follows:

"There have been no unusual happenings or experiences in this state with regard to the control or elimination of cross connections during the past year. We are regularly receiving monthly reports on the daily operation and testing of some 65 fire pump chlorinators which have been approved and are in operation in industrial plants, treating the industrial water supply which is cross connected with the municipal supply through the special installation of dual Factory Mutual check valves, plans for such installations having been approved by the Department. No new installations have been made during the past year."

New Jersey. Regulations were enacted in this state in 1928 by the Department of Health. Mr. Croft, Chief Engineer of the Department has furnished the Committee with the following information:

"I believe that the local health officers and water superintendents are becoming more appreciative of the problems entering into the matter of cross connections. This conclusion is based upon the increasing correspondence between the interested parties and this department and increasing requests for joint inspections by the local authorities. This coöperative move is being encouraged, we believe, by the application forms used by the department. Copies of these forms are enclosed and you will note that one is for the establishment of the cross connection and the other is to continue to maintain. The permission to continue to maintain is issued for a one year period and is renewed if recommended jointly by the water company or water department and by the local board of health. Such a procedure not only keeps this matter a live issue but grants equal authority to the two parties concerned in local supervision for if either one does not approve this department will not issue the renewal permit."

Ohio. Regulations with respect to cross connections were published by the State Department of Health of Ohio in 1927. The following statement prepared by Mr. F. H. Waring, Chief Engineer is an excellent summary of the work of this Department:

"It will be noted that cross connections are permitted (1) with double bronze sanitary check valves separating the two systems *only* to a fire protection system and then *only* where there is *absolutely no regular use* of water from

the fire protection system; that is, water passes through the fire protection system only in case of fire or for short intervals when fire pumps are being tested; or (2) to a private water system which can meet all of the requirements of a public water works system.

"Until recent years cross connection surveys were undertaken by this department generally only when some trouble due to cross connections had occurred in some municipality. The reason for this was the tremendous amount of work involved, the limited personnel available for such work and the failure of local officials to recognize the need of the elimination of cross connections.

"During recent years cross connection surveys have been undertaken in Ohio at Cleveland, Columbus, Dayton, Middletown, Marion, Mansfield, Tiffin, Youngstown, Canton, Chillicothe and a number of other cities. This work is proceeding as rapidly as the facilities of this department will permit and will, we hope, be carried on until all of the municipalities in the state have been covered. Our efforts are of course concentrated first on the larger cities in the state where the industrial water supplies are most numerous and where the cross connections cause hazards to the greatest number of persons.

"Generally speaking, we are receiving excellent coöperation from the local water works officials. Without such coöperation the attempt to eliminate cross connections would be futile since it would require more men than our entire present force to make the surveys and the inspection required.

"Our procedure has been to visit the municipality and to confer with the local city and water works officials regarding the cross connection survey. We also undertake to instruct the local officials in charge of the survey regarding the methods of conducting the survey and the connections to be looked for. In several instances a representative of this department has started the survey which was then taken over by the local officials. After the survey has been completed and drawings or sketches prepared showing the existing cross connections, this department reviews these drawings with the local officials and advises regarding the cross connections to be eliminated, safe methods of making city water available and the type of cross connection to be maintained in case a cross connection is to be permitted. The instances where cross connections are permitted are very rare in comparison with the number eliminated.

"Considerable impetus has been given to the elimination of cross connections in this state by the U. S. Public Health Service which has warned that certification of public water supplies for use on interstate carriers will be refused where dangerous cross connections to public water supplies are permitted to remain. This edict has been of much assistance to this department and also to local water works officials in carrying forward this campaign.

"I note that in some other states cross connections have been absolutely prohibited even to fire protection systems where the separation between the two supplies is by double sanitary check valves. Such an attitude may be ideal, but I do not believe it is very practical, at least in Ohio. We find that the cross connections for fire protection are the ones which the individuals are most anxious to maintain even if they must go to considerable expense to provide the proper type of separation devices. I believe that an arbitrary decree prohibiting all types of cross connections would prevent us from secur-

ing the coöperation which we have had in eliminating cross connections and in providing proper types of separation, and would also lead to the installation and maintenance of cross connections without the knowledge of this department."

"As previously stated, this department intends to continue this work as rapidly as possible. We have found that it is a tremendous and continuous piece of work which will probably never be entirely completed but we expect to have the surveys completed and cross connections eliminated in the larger cities of the state within a reasonable time."

Wisconsin. In Wisconsin, Mr. L. F. Warrick, State Sanitary Engineer, reports that of a total of 190 cross connections to nonpotable supplies 91 have been eliminated, that 88 have been permitted to remain in existence subject to proper maintenance, but that 11 remain which at last inspection were unsatisfactory.

East Bay Municipal Utility District, Oakland, Calif. In 1932 the district, in coöperation with the State Department of Public Health carried out a successful program for the elimination and control of cross connections. The general plan adopted was similar to that recommended in the report of Committee No. 8. An inspection of every industry, business house and home having a well, or other possible source of secondary supply, showed 408 active cross connections which may be divided into the following groups:

Private wells for domestic use.....	224
Private wells for industrial use.....	80
Private wells for commercial use.....	88
Salt water supplies.....	6
Swimming pools.....	10
Total.....	408

The methods followed by the 408 consumers in carrying out the program together with the number adopting each of the various methods, were as follows:

Public water service removed.....	51
Two supplies separated by independent systems of pipes.....	183
Public supply carried over top of tank.....	68
Well abandoned.....	18
Double check valves installed.....	88
Total.....	408

At the conclusion of the program a full certification of the public water supply was given by the State Department of Public Health.

Rhode Island. In 1933 the Division of Sanitary Engineering of the Rhode Island Public Health Commission made a considerable number of cross connection surveys which will probably be used later as the basis for suitable regulations.

Brooklyn, New York. The Water and Health Authorities have been active in the elimination of the few remaining cross connections at industries along the water front.

CONCLUSIONS

Progress is being made in the elimination of cross connections, but a vast amount of work remains to be done. Attention is called particularly to the Committee's previous recommendation that cross connections in building piping and plumbing be eliminated and that plumbing codes contain a provision to guard against the installation of such cross connections. Only very limited progress has been made in the elimination of this type of cross connection. Continued emphasis is laid upon the desirability of the inauguration of state wide programs in those states which have confined their efforts to the occasional elimination or protection of a cross connection. The experience of the East Bay Municipal Utility District mentioned above is additional confirmation of the Committee's previous conclusion that the great majority of cross connections can be eliminated readily. Nothing in the experience of the past two years, which has come to the attention of the Committee, indicates the need for any change or modification in the conclusions and recommendations in the report submitted May 2, 1932. The Committee feels that a wider use of the report could be made.

Respectfully submitted,

E. SHERMAN CHASE, Chairman.

For Committee No. 8 on Cross Connections.

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THE MINE SEALING PROGRAM ON THE OHIO RIVER WATERSHED

BY E. S. TISDALE AND E. W. LYON

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With the change in America within the last fifty years from a rural to an industrial nation, many resultant effects have occurred on our streams. Pittsburgh constitutes one of the great industrial centers of America and here at the junction of the two main tributary streams of the Ohio River, the Monongahela and Alleghany Rivers, we see the results of industrialism, and of the extensive coal mining of northern West Virginia and western Pennsylvania.

In 1899, according to investigations of Allen Hazen, neither the Monongahela or the Youghiogheny Rivers showed evidence of acidity. In 1931, Chester F. Drake, Superintendent of Filtration at the Aspinwall Filtration Plant of Pittsburgh in a most exhaustive report at the American Water Works Association on acid mine drainage, summed up the progressive deterioration of these streams with acid mine drainage wastes. This type of industrial waste constitutes the greatest and most menacing of all our stream pollution in this section of the country.

Pennsylvania and West Virginia together produce more than 60 percent of the bituminous coal mined in the United States and in 1930 Pennsylvania produced 123,417,850 net tons of coal. West Virginia in that year produced 122,429,767 net tons of coal. The Monongahela River runs acid most of the year and the Alleghany River is rapidly tending toward an acid condition.

The abandonment, temporarily and probably permanently, of large acreages of coal in Pennsylvania, Ohio and West Virginia due to the depression has given an opportunity to these states to apply on a large scale certain principles of acid mine drainage control by air-sealing abandoned mines never before attempted. This has been done as a part of the President's recovery program by federal and state coöperation of public health services.

Mr. Edward C. Trax in charge of water purification at McKeesport,

last year presented to our meeting a splendid paper summarizing 25 years experience in the purification of acid waters. At that time he hinted at the program upon which western Pennsylvania, northern West Virginia and eastern Ohio have jointly embarked. He said at that time, after reviewing the failure of all methods tried over a period of 25 years for controlling acid mine drainage—

"It has been suggested that by sealing abandoned mines and placing bulk heads in isolated worked out sections of active mines, the oxidation process could be retarded by the exclusion of air, as both air and moisture are required for the formation of acid water in the mines. This has been tried, and in some instances found successful, and it appears to be the most promising of the attempts made so far to cope with the problem."

The Inter-state Stream Conservation Agreement of 1924 signed by the State Health Departments of Pennsylvania, Ohio and West Virginia, November 17, 1924 has been the cornerstone upon which the practical measures for stream pollution control in the Ohio River basin have been erected within the past decade.

We should take this opportunity to pay tribute to the public health statesman, the late Dr. John E. Monger, Health Commissioner of Ohio, whose vision and dynamic driving power led to the consummation of this coöperative effort among states to clean up the entire watershed.

The phenol wastes pollution question is well under control, safe sewage disposal at the large cities along the Ohio is starting and now we see a unified effort in these states being made to curb acid mine drainage; all through the instrumentality of this coöperative Agreement in 1924. One of the results of the Inter-state Stream Conservation Agreement of 1924 was the starting of the mine wastes studies by Dr. R. R. Sayers, Mr. W. P. Yant and Mr. R. D. Leitch, which have culminated in the large scale mine sealing experiment.

In October, 1933, the combined experience of the U. S. Bureau of Mines, of the U. S. Public Health Service and of the states of Pennsylvania, Ohio, West Virginia and Kentucky resulted in a report being filed in Washington, first with the Public Works Administration and later with the Civil Works Administration, where it was favorably acted upon, calling for these governmental agencies under the direction of the U. S. Public Health Service to expend \$1,500,000 in a unified effort to seal abandoned coal mines in Pennsylvania, Ohio, West Virginia, Kentucky and six other states farther down along the Ohio River. Of this amount only \$355,000 was expended during the Civil

Works Administration period of January, February and March, 1934, but it launched the program which we shall briefly describe to you as the most comprehensive effort ever made to control acid mine drainage in the United States.

REASONS FOR UNIFIED ACTION ON THE OHIO RIVER BASIN

The far reaching and ever increasing scope of detrimental influence of acid mine drainage was attested by the official statements of the chief engineers of Pennsylvania, Ohio, West Virginia and Kentucky in a summary report formulated at Huntington, West Virginia, which set forth to the authorities at Washington the need of unified, simultaneous and coöperative action toward sealing abandoned mines in all these states.

It was pointed out that in August and September, 1933, the extension of the acid zone came farther down the Ohio River from Pittsburgh than ever before. This condition detrimentally affected the public water supplies in all these states, particularly in Huntington, West Virginia, Ashland, Kentucky, Marietta, Ironton, Portsmouth and Cincinnati, Ohio and Louisville, Kentucky, the last named city being over 400 miles down stream from Pittsburgh which might be termed the meeting place of the mine acid waters from northern West Virginia and western Pennsylvania. The engineering report further pointed out that the sealing abandoned coal mines project came well within the scope of the National Industrial Recovery Administration, since it included conservation and development of natural resources, including control, utilization and purification of waters. The report further enumerated, in addition to the menace to public health through endangering public water supplies, the following types of damage to other public interests:

- (a) Increased cost of construction and operation of water works;
- (b) Corrosion of the metal and concrete of federally built and operated navigation dams, amounting to several million dollars annually, according to the reports of the Army engineers;
- (c) Corrosion of metal boats using such streams for transportation of goods in inter-state commerce;
- (d) Making difficult the use of the water of such streams for industrial and steam raising purposes;
- (e) Disintegration of metal and concrete culverts and bridge

abutments on state and federal highways as shown by studies in certain states.

- (f) Preventing stock watering in the smaller tributary streams and injury to agricultural lands;
- (g) Preventing recreational use of streams.

THE SEALING ABANDONED MINES PROGRAM

About December 15, 1933 the U. S. Public Health Service was designated by the Civil Works Administration as the agent to spend \$1,500,000 on sealing abandoned mines in ten states, Pennsylvania, Ohio, Kentucky, West Virginia, Maryland, Illinois, Indiana, Tennessee, Alabama and Virginia on the Ohio River Basin. The Surgeon General, Dr. Hugh S. Cumming, appointed each state health commissioner as state agent. Meetings were held at several points and a unified program for sealing the mines was set up, utilizing the research work and the experiences of the U. S. Bureau of Mines and the Departments of Health of Pennsylvania and West Virginia, which had been working at the problem for some time in a small, but efficient manner.

Although things had been carefully planned, the most severe winter known in northern West Virginia and western Pennsylvania set in, delays ensued and finally Congressional action required dissolution of the project as a Federal one and when the Civil Works Administration ceased to function on May 1, only \$335,575 had been spent of the \$1,500,000 allotted. It was impossible to plan this gigantic job, organize it and complete it in 90 days and consequently the work in Pennsylvania was only 10, in West Virginia 25 and in Ohio 2 percent finished and the hope of making a real decrease in acidity on the upper tributaries of the Ohio was deferred, although a splendid start had been made.

OHIO MINE SEALING PROGRAM

Under F. H. Waring, Director, and B. F. Hatch, Assistant Director, the mine sealing program in Ohio, the first every attempted in this state, has gone forward steadily. During August, 1934, they made the following report of work in Ohio.

"By continued effort, the program was gradually expanded, particularly after the cessation of the work as a Federal project and its continuation as a state project. During the last week of March a maximum force of 337 people were engaged in carrying on this project. At the close of the C.W.A. program on March 31, 1934, 492 openings had been closed at an average cost of about

\$63.00 per opening. These closures are scattered over thirteen counties in the coal mining district. In general, a total of 6081 man days of personal service were expended in closing 492 openings or an average per opening of 12.3 man days.

Since the end of the C.W.A. program, the work has been continued at the discretion of the county relief organizations in eight of the original thirteen counties in which work was carried on. Approximately 800 openings have been closed during the months of April, May, June and July using labor provided by the relief organizations and materials transferred from our C.W.A. stocks. Supervision of the work has been provided in a limited manner by the State Relief Commission.

The work accomplished is merely a beginning in this important program. Preliminary estimates indicate that about 5 percent of the abandoned mine openings in Ohio have been closed to date. It is estimated that about 23,700 openings remain to be sealed in the thirty counties in the coal mining area."

TABLE 1

Sealing abandoned coal mines in Ohio

Summary of closures

August 1, 1934

COUNTY	CLOSURES FOR JULY	TOTAL CLOSURES TO JULY 1, 1934	TOTAL CLOSURES TO AUGUST 1, 1934
1. Belmont.....	1	17	18
2. Carroll.....	0	29	29
3. Columbiana.....	0	1	1
4. Coshocton.....	0	20	20
5. Guernsey.....	2	36	38
6. Tuscarawas.....	15	99	114
Sub-totals.....	18	202	220
7. Athens.....	44	162	206
8. Hocking.....	68	123	191
9. Jackson.....	20	15	35
10. Meigs.....	32	133	165
11. Morgan.....	0	48	48
12. Muskingum.....	28	137	165
13. Perry.....	10	59	69
14. Vinton.....	30	138	168
Sub-totals.....	232	815	1,047
Totals.....	250	1,017	1,267

PENNSYLVANIA MINE SEALING WORK UNDER CENTRALIZED CONTROL

Chief Engineer, W. L. Stevenson, Assistant Director, J. W. Paul and others engaged on mine sealing in Pennsylvania worked out com-

prehensive plans for mine sealing by watershed districts. Mr. W. L. Stevenson's leadership in the mine sealing program on the Ohio River Basin has been a major factor in inaugurating the work. He reports that a total of \$152,000 has been spent in Pennsylvania under the three relief programs. He has recently summarized the work done and it is of interest to note the accomplishments in Pennsylvania.

"Wages were about 96 percent of the cost of the field work and materials about 4 percent.

During the three projects in Pennsylvania, Federal C.W.A., State C.W.A., and State Works Division, due to the skill and training of the supervisory force and the care of the foremen, who were practically all trained in safety work, as were many of the miners, there was no lost time accident during the entire prosecution of the work, which involved 24,000 man days.

Work was done on 277 mining properties and of them, all openings were sealed on 232 mines.

At the peak of the program, 1,242 miners were employed on mine sealing.

The obtaining of signed releases from the owners of surface and mineral rights to do the work upon the property was often a difficulty because of absentee owners, properties held by companies and trust companies requiring official action and because of ignorance and misunderstanding concerning the mine sealing work.

Work was done on the following main watersheds in Pennsylvania:

1. The Monongahela River, used extensively as a source of water supply in Pennsylvania, and which has its head waters in West Virginia, where considerable work was done in sealing mines, the result of which will benefit Pennsylvania.
2. The watershed of Kiskiminetas-Conemaugh River which flows into the Alleghany River at Freeport, Pennsylvania, which is upstream from several important water works including the slow sand filter plant at Pittsburgh, which is particularly susceptible to the malign influence of sudden changes in alkalinity of the raw water.
3. On the catchment area of the headwaters of the West Branch of the Susquehanna River which is not part of the Ohio River drainage basin."

TABLE 2

Sealing abandoned coal mines in Pennsylvania

PROJECT	MAN	WAGES	DRIFTS SLOPES SHAFTS CAVES	TRAPS	CREVASSES
	<i>days</i>	<i>dollars</i>			<i>linear feet</i>
Federal C.W.A.	15,445	71,545	4,126	1	28,690
State C.W.A.	4,724	21,101	1,990	34	4,981
State W.D.	3,812	17,370	1,837	54	174
Totals.	23,981	\$110,016	7,953	89	33,845

THE PROGRESS IN WEST VIRGINIA

Since the start of the work of sealing abandoned coal mines in West Virginia, it has been done in a comprehensive manner under a systematic plan by trained and experienced mining engineers and mining inspectors receiving the support of the State Department of Mines. The director has for twenty-five years been engaged in mining engineering and in solving mine drainage problems. Great hopes have been entertained that real conservation of the West Fork, Tygart Valley, Monongahela and Cheat Rivers could be accomplished. It was this hope that led to the enthusiastic carrying on of the program, the district supervisors working day and night during the months of January, February and March, 1934 to get the most value from the 968 men who were employed at the peak of the program. When the Federal project terminated in March, 1934, the several states went ahead to the best of their ability with the relief organizations. In West Virginia we have been fortunate to have had the wholehearted support from the State Emergency Relief Administration. The State Health Department and the State Water Commission have continued the district supervisors and the counties have set up the Emergency Relief Administration projects on mine sealing. Thus the program has been continuously carried on, although only about 150 men are at work in 10 counties now compared to nearly 1,000 in 17 counties during the winter months. For the most part, salvage work and completing unfinished mines is being done with the small corps of men under Emergency Relief Administration. Under this present plan, the summary shows about \$100,000 worth of projects are set up to run to October 1, 1934.

Some idea may be obtained from figure 1 of the enormous amounts of acid mine drainage entering the tributaries of the Ohio River in West Virginia and our conception of how far our work must be carried to result in real conservation of the streams.

It is estimated that $1\frac{1}{2}$ million pounds of acid per day is flowing from the abandoned mines. The idle mines contribute nearly another million pounds daily and the active mines $36\frac{1}{2}$ percent of the total or $1\frac{1}{2}$ million pounds acid daily. This makes the enormous total of $3\frac{1}{2}$ million pounds of acid daily, flowing into West Virginia streams from active and abandoned mine openings.

Only a small part of the work has been done with 22 percent of openings sealed, 8.8 not yet completed and 69.2 percent not started. Our salvage work this summer is showing that those areas sealed

must be carefully investigated, for shrinkage frequently occurs, which again establishes ventilation.

The distribution of sealed and unsealed mines on a typical tributary stream, of which there are 87 in West Virginia, is also shown on figure 1. Such streams can be practically reclaimed and this will be a

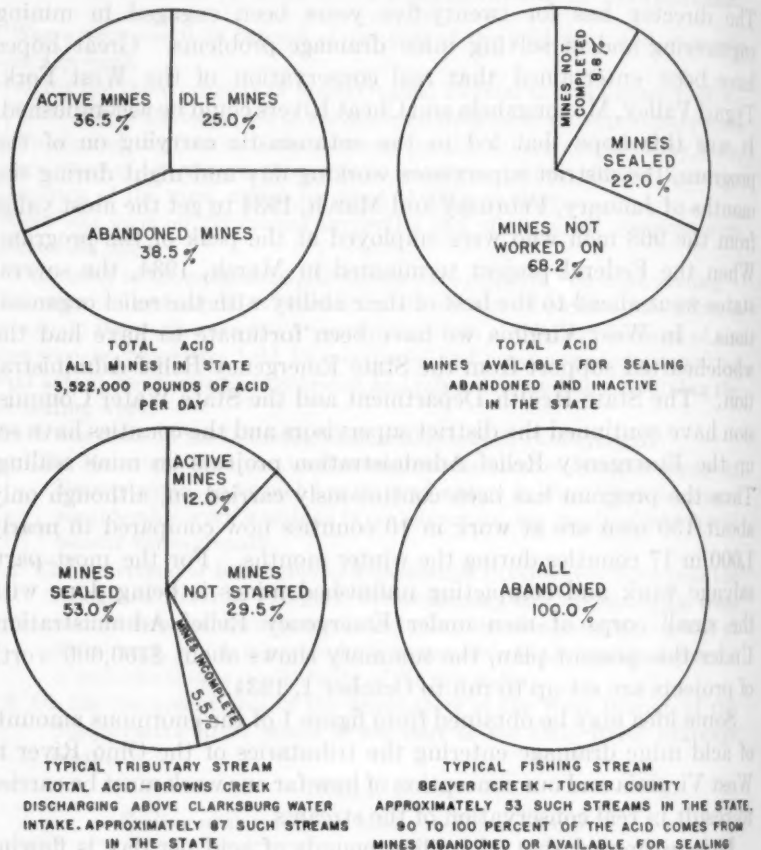


FIG. 1

great benefit to public water supplies down stream. Brown's Run, the stream shown, damages the Clarksburg water supply.

West Virginia sportsmen are particularly interested in the acid reduction program. Fifty-three streams in northern West Virginia, which are fitted for fishing can be reclaimed, as the mines are 100 percent abandoned and available for sealing.

Laboratory control tests—lowered acid content already noted

The laboratory tests have all been made at the West Virginia University Sanitary Engineering Laboratory by Mr. George Pyle, under the supervision of Professor L. V. Carpenter, who has made a special study of mine drainage in West Virginia. The latest publication is "Acid Mine Drainage" by Professor Carpenter and L. K. Herndon. For four years, the University and the State Water Commission have been cooperating on stream surveys and experimental work on mine sealing.

Tests show the most noticeable drop in free acid content, and contrary to expectations, the beneficial results of sealing have shown up sooner than anticipated. A warning was issued, when our work was started, for the general public not to look for miracles. We did not expect to perform them. From one to three years was the time set for appreciable lessening of the acidity of the acid mine drainage. Such will probably be the case, but notwithstanding the fact that many of the seals have shrunk and are admitting air, measurable and visible results are already apparent showing acid reductions of 25 percent and better.

We have real hopes that we are at last on the right trail to conquer the menace of acid water. Prominent mining engineers from central West Virginia, who are watching our program comment favorably on the results which are beginning to show. The lay persons in the agricultural sections of the state advise that cattle are beginning to drink the water again as it approaches the alkaline point. Sportsmen and fishermen, who are watching the progress of the work, report improvement in fishing as the mine wastes are reduced in the tributary streams. Operators of water purification plants report with enthusiasm that the water issuing from some of the sealed mine openings shows a pH near the neutral point and, in some cases, definitely alkaline.

One old experienced mining engineer, now in West Virginia, formerly from Pennsylvania, told how he recently returned to his boyhood home in Pennsylvania on vacation. He went to the drift mouth now all fallen in so that the air was completely sealed out of the mine. Formerly highly acid water flowed away and now as he looked the water appeared clear and inviting. He tasted it and found a sweet, fine drinking water, a real spring water again. The lapse of time between his boyhood and this visit was 40 years. He has given us enthusiastic cooperation. Our program is to help nature fill up these

drift mouths quickly and exclude the air so that the formation of the acid and iron salts will not take place. We are trying to cut the time from 40 to 4 years.

Accomplishments to date in West Virginia

Operations have been carried out on 154 mines, of which 110 were sealed, except for subsequent maintenance requirements. Closures were made on 1,364 serial numbered work accounts representing approximately 4,000 major and minor openings, toad holes, crop breaks, etc. Over 1,000 water measurements were taken and chemical analyses made of the water samples. Accurate detailed cost accounting was maintained on all work. Labor was employed under the Civil Works Administration at a total expenditure of \$129,487.84 for all purposes and covered 33,564 man days.

Exceedingly valuable salvage, maintenance and completion of unfinished mines are being accomplished under the Emergency Relief Administration.

Investigations already made show that there are at least 400 mines requiring attention, on which work has not been started, which must be sealed before any real stream conservation can be accomplished and the program be made a success.

Heartiest coöperation has been received from the coal operators and surface owners and a vital interest and support have been displayed by Wild Life League members and the public generally.

Economically it is known that the annual expense caused by the effects of the acid water is many times the total cost of the preventive program.

(Presented before the Central States Section meeting, August 22, 1934.)

SOCIETY AFFAIRS

THE ANNUAL CONVENTION

The 54th Convention of the American Water Works Association was opened in New York City on June 4, 1934, by President Malcolm Pirnie.

After the reading of the Secretary's and Treasurer's report, Maurice P. Davidson, Commissioner of the Department of Water Supply, Gas and Electricity, New York City, officially welcomed the Convention to the city. Mr. Davidson praised the work of William W. Brush, retiring Chief Engineer of the Department.

F. G. Cunningham, Chairman of the John M. Diven Memorial Award Committee, announced that this prize was awarded this year to Leonard P. Wood, Engineer at the Board of Water Supply, New York City, for the commendable manner in which he had served the Association during the past year, both in its convention activities, and as Chairman of the Sub-Committee of the Committee on Cast Iron Pipe. It was Mr. Wood who conducted the symposium on cement lining of pipes at the Chicago Convention in 1933.

James E. Gibson, Chairman of the Goodell Prize Committee, reported that the Goodell prize for the best paper presented before the Association during the past year had been awarded to Willard T. Chevalier, Vice-President of the McGraw-Hill Publishing Company. Mr. Chevalier's paper was presented at the Chicago Convention on "The Place of Public Works in the Economic Scheme."

Nicholas S. Hill, in reporting on the work of the Electrolysis Committee, pointed out the activity on the part of utilities and manufacturers in furthering the use of bare neutral ground wire by the utilities.

Believing that a growth of this practice would be dangerous and damaging to piping within a building, Mr. Hill offered a resolution that the Association make unqualified objection to the practice. This resolution was passed unanimously.

The city officials of Pasadena, California, recently passed a resolution changing the name of Pine Canyon Dam to the Morris Dam, in honor of S. B. Morris, Chief Engineer of Water Works, Pasadena, and under whose supervision the dam was built.

In recognition of this honor bestowed upon Mr. Morris, Abel Wolman, at the request of the Executive Board, presented a resolution commending the city officials at Pasadena for the recognition given to Mr. Morris and, through him, to the water works field. This resolution was carried unanimously.

The following officers were elected for the ensuing year: President, Harry E. Jordan; treasurer, William W. Brush.

The Superintendents' Round Table Discussion, at which Carl A. Hechmer presided, was the sole topic on the Monday afternoon session. A wide range of topics was discussed.

Tuesday, June 5, Morning

In opening the Main Session on Tuesday morning, W. W. Brush outlined the present system of works supplying greater New York with water. He described further the various steps which may have to be taken at an early date to increase the present available sources of supply.

L. P. Wood discussed Mr. Brush's paper and presented data to show that complete meterage of New York Water Supply at this time would not solve the problem of future demand. The present per capita consumption in New York is 140 gallons per day, which Mr. Wood pointed out is not at all excessive. He believed that the immediate construction of additional supply works was imperative.

The results of an intensive study into a special water problem were described by Frank Hale, Director of Laboratories, Department of Water Supply, New York City, in his paper, "Pipe Corrosion Experiments, Catskill Supply, New York City."

Willard T. Chevalier, Vice President of the McGraw-Hill Publishing Company, New York, outlined the present status of water works construction under the PWA program.

In the discussion of Mr. Chevalier's address, Abel Wolman, PWA State Engineer of Maryland and Chief Engineer of the State Department of Health, at Baltimore, Md., expressed the belief that heavy federal appropriations for public works construction in times of depression may be productive of results just the opposite of those hoped for.

Tuesday, June 5, Afternoon

The Main Session of the Convention convened at about 2 p.m. with President Malcolm Pirnie in the Chair. The opening feature was a

discussion on "Direct Purchase of Material and Equipment Versus Purchase Through Contractors." This was led by Paul Hansen, of Greeley & Hansen, Hydraulic and Sanitary Engineers, Chicago, Ill.

L. R. Howson, of Alvord, Burdick & Howson, Consulting Engineers, of Chicago, discussed the question.

The problems arising from frozen services were discussed by Reeves J. Newsom, President of the Community Water Service Company, in his paper on "Thawing Frozen Service Pipes."

Mr. Newsom's paper was discussed by J. Arthur Jensen, Supervisor and Engineer, Water Works, Minneapolis, Minn. and by C. A. Holmquist, Chief Engineer, State Department of Health, Albany, N. Y.

A paper on "Recent Tendencies in Relation to Valuation of Water Rights," was presented by Robert E. Horton, Consulting Engineer, Voorheesville, N. Y.

In discussing this paper, Charles M. Sherman, Consulting Engineer, Boston, said that diversion of water from small streams is apt to take away from those lower down so much water as to cause damage. Riparian rights, where not usable, must be predicated upon something else. Where no commercial rights are invaded, property rights require substantial damages. Where property is taken for public enterprizes liberal dealings should be had. On the other hand, where a hold-up is involved, there are many considerations which must be decided.

A. H. Pratt, Consulting Engineer, Newark, N. J., also spoke of the difficulties arising from the adjustment of sales of real estate in connection with public developments. Many of these no engineer could decide, and it would require the knowledge of a real estate man to encompass them.

H. T. Critchlow, Division Engineer, New Jersey State Water Policy Commission, Trenton, N. J., said that in matters of compensation there was entirely too much selfishness and not enough public spirit to get the best results.

The concluding paper of the session was on "Tests of Friction Loss in Distribution Piping," by Burt B. Hodgman, Vice-President and Chief Engineer, National Water Main Cleaning Company, New York City. This paper was read by Clinton Inglee, General Manager of the Company, since Mr. Hodgman was just recovering from a severe illness, although he was present at the meetings.

The paper was discussed by Edgar K. Wilson, E. E. Bankson, Charles M. Sherman, J. W. Ackerman and J. E. Gibson.

Wednesday, June 6, Afternoon

At the opening of the Main Session on Wednesday afternoon, "Outstanding Factors in Underground Water Waste Surveys," was explained by Fred B. Nelson, Civil Engineer, Department of Water Supply, Gas and Electricity, New York City.

W. L. Ransom, Attorney, New York City, outlined the changes which are occurring at the present times in both laws and policies in the making of rates for water service.

The following officers were elected by the Plant Management and Operation Division for the following year: Chairman, John Winder; directors, W. V. Wier, G. C. Story, H. W. Griswold, and Carl A. Hechmer, ex-officio.

Thursday, June 7, Morning

At the opening of the Main Session on Thursday morning, Joseph P. Schwada, City Engineer, Milwaukee, Wisconsin, described "Milwaukee's Water Purification Problem."

In discussing Mr. Schwada's paper, John R. Baylis, Physical Chemist, Bureau of Engineering, Chicago, said there is no question that the filter plant is a much needed improvement.

Malcolm Pirnie, formerly Deputy Administrator of the PWA at Washington, asked if the PWA was of any help in getting the project started. Mr. Schwada said that negotiations were first started with the RFC, but that the PWA helped to clinch the matter.

An illustrated paper, "Automatic Pumping Equipment and the Telephonic Supervisory System in Baltimore," was contributed by Leon Small, Water Engineer, Bureau of Water Supply, Baltimore, Md.

Following this paper there was a demonstration of automatic pumping station signals from Baltimore, through the coöperation of associated telephone companies. Calls were made to the various pumping stations at Baltimore provided with automatic pumping control, and information as to the condition of the plant operation conveyed by means of dot and dash buzzer signals, in accordance with the plant buzzer code. At one of the plants an operator was stationed to throw the machinery out of line to duplicate conditions when the plant was not working as it should. Signals then came through that the plant was not working satisfactorily, and later when conditions were normal, signals came through that the plant was working all right.

A paper on "Telemetering—the Electrical Transmission of Gage and Meter Readings" was read by P. S. Wilson, Consulting Engineer, Glen Ridge, N. J.

The subject of telemetering was then discussed by C. E. Stewart of the General Electric Company who has been identified with this development since 1920.

D. J. Purdie, of the Builders Iron Foundry Company, contributed to the discussion. At Chicago, telemeters are operated over a distance of 2 miles and at the New England Water Works Convention, there was a demonstration of telemetering over a distance of 95 miles.

Others who took part in this discussion include T. A. Heine, of Reading, Pa.; P. MacGahon, of the Westinghouse Manufacturing Company, C. A. Buckard, of the American Telephone & Telegraph Company, and A. S. Hibbs, of Cincinnati.

The Chairman announced that the Nicholas Hill, Jr., Cup which is awarded each year to the section of the Association showing the largest gain in membership for the year, was awarded to the Canadian Section. This section showed a 20 percent gain in membership.

WATER PURIFICATION DIVISION

Monday, June 4, Afternoon

The work of the Committee on Specifications and Methods of Tests for Water Purification Chemicals was discussed. This committee, under the chairmanship of Mathew M. Braidech, Senior Chemist, Baldwin Filtration Plant, Cleveland, Ohio, submitted a comprehensive report of 322 pages on the use, manufacture, properties, specifications and methods of tests of chemicals used in water purification. Besides Mr. Braidech, this committee includes R. C. Bardwell, William U. Gallagher, Gilbert L. Kelso, Winfield S. Mahlie, August G. Nolte and George R. Spaulding.

Tuesday, June 5, Afternoon

A paper on "The Air-Dilution Method of Odor Determination in Water Analysis" was presented by Gordon M. Fair, Associate Professor of Sanitary Engineering, and William F. Wells, Instructor in Sanitary Science, Harvard University.

The paper was discussed by M. Warren Cowles, Health Officer, Hackensack Water Company, New Milford, N. J.

Mr. Baylis said that the water dilution method is better than the air dilution plan for odor calibration.

Dr. Frank E. Hale, Director of Laboratories, New York City Department of Water Supply, asked if the material holding the liquid affects the taste and if touching the nose with the instrument affected the odor. Prof. Fair answered that it did not, as the olfactory area is not touched.

A paper on "Occurrences and Control of Iron Bacteria in Water Supplies," prepared by Kenneth W. Brown, Sanitary Engineer, California Water Service Company, Stockton, California, was read by the Chairman, George Norcom. Mr. Brown was unable to be present.

Dr. Hale, in discussing the paper, said the methods of identification and cultures advance the available knowledge of iron bacteria. New York City has found that crenothrix flourishes in the open air. A jelly growth in wells is controlled by less than 0.3 p.p.m. chlorine. Dark brown masses in the water may be due to crenothrix.

Weston Gavett, Consulting Engineer, Plainfield, N. J., told of an experience at Freeport, N. Y., where water had a red color and an iron content of 0.3 p.p.m. Iron bacteria were found in the water, no deposit was found in the mud drum of the standpipe, although growths were found in pipes. Small amounts of iron were deposited in the mains. By coating the sand filters with iron bacteria, he said that iron can be removed from the water.

Wellington Donaldson, Consulting Engineer, New York City, said that it is his belief that there is scarcely any distribution system in the country, where there is no residual chlorine in the mains, wherein the organisms described will not be found.

Mathew M. Braidech and F. H. Emory, Spectrographer, National Smelting Company, Cleveland, presented a paper on "The Spectrographic Determination of Minor Chemical Constituents in Various Water Supplies in the United States." The paper was read by Mr. Braidech. A study was made of widely distributed water samples. The spectrograph is gaining recognition in many industries.

Sheppard T. Powell, Consulting Chemical Engineer, Baltimore, Md., emphasized that the spectrograph is an accurate instrument for making quantitative analysis. It was used at Johns Hopkins University for determining the amount of metals in foods. The results obtained by this method are far in advance of other ways of making determinations. The instrument has great possibilities, but it is limited in scope because of the initial cost of the apparatus. He believes that it will be possible for commercial laboratories to engage in such analyses.

Ralph E. Noble, Bacteriologist, Chicago, presented a paper on "Solid Green Lactose Bile Medium Giving Results in Nineteen Hours."

Concerning the report of the Committee on Testing Zeolites, Sheppard T. Powell said that zeolites should be tested. He offered to send preliminary directions to all who are interested. The committee merely presented a progress report but hopes to bring out a standard method of test.

A report of the Committee on Filtering Materials was read by Frank W. Herring, Assistant Editor, Engineering News-Record. Discussing the report, G. Gale Dixon, Consulting Engineer, Youngstown, Ohio, remarked that the problem of filtering materials was complicated by the large amount of details such as the size of sand grains, chemical treatment, quality of the water, seasonal variations, and efficiency of the design of washing arrangements. Mr. Baylis and August G. Nolte, Chief Chemical Engineer, St. Louis, Mo., Water Department contributed to the discussion.

The following officers were elected by the Water Purification Division: Chairman, Sheppard T. Powell; vice-chairman, A. E. Berry; secretary-treasurer, Charles R. Cox; directors, C. J. Lauter, G. D. Norcom, and W. M. Wallace.

Wednesday, June 6, Morning

A general symposium on chlorination was held at the Wednesday morning session.

Various means to chlorinate efficiently a small supply were covered by Charles R. Cox, Associate Sanitary Engineer, New York State Department of Health, in his paper, "Equipment for the Chlorination of Small Water Supplies."

L. L. Hedgepeth, Manager, Technical Service Department, Pennsylvania Salt Manufacturing Company, Philadelphia, Pa., read a paper, illustrated with lantern slides, on "Handling Chlorine to Avoid Trouble."

Charles E. Trowbridge, Sanitary Engineer, American Water Works & Electric Company, New York, started a discussion of these two papers. Chlorine gas, he said, is heavier than air and expels air, and for that reason instructions on the use of chlorine must be complete. They should include the use of the gas mask. For safety reasons, there should be a duplication of equipment. Emergency repairs should be made thoroughly and without haste.

James A. Parks, Senior Chemist, Department of Water Supply, Detroit, added to remarks previously made concerning the use of gas masks. The canister type is satisfactory only for small leaks. Detroit inspects gas masks every two or three weeks. Whenever they are used, the length of time used is marked on the card so that there is a record of how much life remains for each gas mask. For severe leaks, the ordinary canister type mask is not satisfactory. For such cases it is best to use a hole line so the operator can breathe fresh air from the outside.

A question on the rupture of a chlorine container was asked Mr. Hedgepeth. The ruptured container should be taken out of the plant or its contents by-passed. It may be possible to drive lead wool or putty into the rupture. He described an instance where water was poured on the chlorine to form chlorine hydrate.

A member described an experience at a packing house where a chlorine container had been stored for several years in a damp place. The valve became corroded. Dry ice was packed loosely around the container and the valve was replaced. The cold application created a negative pressure in the tank.

A similar case occurred in New England, and the same method was effective.

The perennial problem of chlorinated water and goldfish was also introduced. It was the opinion of one member that most of the fish loss was due to water changes. Chlorine, if anything, was a benefit as it destroyed fungi growths.

Marsden C. Smith, Engineer of Water and Electricity, Richmond, Va., presented "A Review of the Status of the Ammonia Chlorine Process."

A. E. Griffin, Research Department, Wallace & Tiernan Company, Newark, N. J., spoke on "A Study of the Efficiency of the Ammonia Chlorine Process."

H. E. Jordan led the discussion of these papers. He said the carrying capacity of lines is improved by the ammonia-chlorine process as they become free from flow-retarding growths. Current work appears to be towards a fairer understanding of the process and the value of carbon—the abilities of each must not be confused.

N. J. Howard, Director of Purification, Toronto, Ont., told of large fish exhibits that are held each year in his city. The water was blamed for the death of a large number of fish during the exhibition. Since the dechlorination treatment was instituted, conditions have

improved. A small increase in the amount of chlorine is able to care for the lag in sterilization with the ammonia-chlorine process.

Arthur F. Mellen, Filtration Engineer, Minneapolis, believes that we are harboring a wrong belief if we think that a residual in the water will take care of after-pollution.

The problem of interference of the nitrite ion when making tests for chlorine was reviewed in detail by Roberts Hulbert, Senior Chemist, Filtration Plant, Detroit, Mich., in his paper, "Chlorine and the Orthotolidine Test in the Presence of Nitrites."

Mr. Cox read a discussion prepared by C. A. Holmquist, Division of Sanitation, New York State Department of Health.

A review of all papers presented at this session was given by Linn H. Enslow, Editor, Water Works and Sewerage.

JOINT SESSION OF GENERAL MEMBERSHIP AND WATER PURIFICATION DIVISION

Wednesday, June 6, Afternoon

A. P. Black, Professor of Chemistry, University of Florida, presented a paper on "Coagulation with Iron Compounds."

Robert W. Sawyer, affiliated with Malcolm Pirnie, Consulting Engineer, New York City, in discussing the paper said that iron coagulants have their limitations. Iron coagulation is not of true advantage unless the process proves economical, although he admitted that it may have numerous possibilities. It is necessary to feed the iron compounds properly. He mentioned that water at West Palm Beach, Fla., could not be treated with iron coagulants.

E. L. Bean, Chemist, Providence, R. I., water system reported that his results were favorable to iron coagulation. He said that ferric chloride can form mud balls, although the tendency for them to stick to the filter sand is somewhat reduced. It is not true for all waters that the floe formation is slow. It can be formed in the pH range of 4-10 although it is greatest in the pH zone of 7-9. At Providence, the water is treated with lime to bring the pH value to 9.6.

Mr. Birdsall reported that ferric salts may be effective in a pH range of 9-10.5.

Mr. Pirnie related that when the new plant was started at Providence, red water developed at the dead ends. It was found best to have the water in the distribution system as near pH 10 as possible.

Results at first were to precipitate manganese. Later it became obvious that the water must be treated to free the manganese it contained. After several years of experimentation, the ferric coagulation treatments were developed. Water is drawn from the bottom of the reservoir and the water thus obtained is practically free from algae.

West Palm Beach, Fla., has a shallow surface water storage with 50-250 color and a high temperature. No manganese is present in the water. The water is treated by adding alkalinity to it by mixing it with water obtained from wells. Then the water is treated with alum, aerated, filtered, and again aerated. The water it produces is clear and has a low iron content.

"Significant Features of the Chicago Amebic Dysentery Outbreak," were described by Joel I. Connolly, Chief, Bureau of Public Health Engineering, Board of Health, Chicago, and by Arthur E. Gorman, Engineer of Filtration, Bureau of Engineering, Chicago. Mr. Connolly described the engineering side of the outbreak and Mr. Gorman the epidemiology.

The outbreak, said Mr. Connolly, involved the guests of two hotels. A hypothesis seemed well established that carriers of the disease worked as food handlers. The food handlers of the hotels were examined and then the carrier phase eliminated from the problem. An intensive study was next made of the water and sewage. It is the opinion of experts that structural defects were associated with the outbreak of the disease. A painstaking study was made of hotels and many defects were found. Two types of the defects were considered noteworthy.

Hotel X supplies water to the upper portion of Hotel Z nearby, to a theatre and also to an office building. A higher incidence of carriers was noted in the upper portion of Hotel Z than those in the basement or ground floors having city water. Some hazards were so located that they could be said to be common to both hotels.

Cross connections were found to permit the discharge of condenser water in an overhead sewer main. The piping was so arranged that after the condenser water filled a tank in the basement of Hotel X, a float valve started a pump which lifted the condenser water to the upper floors of Hotel Z. Tests showed that house pumps intermittently pumped city service water. Water from the city main was pumped by means of house pumps and these pumps were controlled by a valve on the roof tank. Water delivered to the hotels

contained a mixture of condenser water and city water. This situation was most hazardous due to pressure conditions.

Another piping system circulated ice water. The water was not piped to the guest rooms but could be carried in by means of pitchers. An ice-cooled water tank was located in the basement below the overhead sewer line. The tank was provided with an insulated cover, loosely fitted, and an opening for the convenience of an electric pump which was mounted on the cover. There were leaks in the sewer main over the tank.

Mr. Connolly emphasized that safety of water supply in a building when it was built does not assure safety at all times, as cross connections may be added at later dates. Buildings must have frequent plumbing inspections to prevent unsanitary conditions in the plumbing.

The outbreak in Chicago the past summer, said Mr. Gorman, is the first large water borne epidemic of amebic dysentery on record. Large correspondence was carried on to get all facts and case histories. Two-thirds of the cases occurred among registered hotel guests and one-third among the resident population. In an attempt to get all the details of the epidemic, 94,000 letters were sent to the registered guests of six of the large hotels including 19,000 guests of hotels X and Z. In order to get a complete medical picture, data were collected on the trip, eating habits, etc. In fact, the city is still continuing its investigations, but the data included in the report presented is as of May 15. Up to that time there were 852 cases and 32 deaths. During the period studied, hotels X and Z had 250,000 guest days. The average was three guest days per registrant. Six percent of the cases in Hotel X were fatal and 6.9 percent in Hotel Z. This he said, is about the same ratio as the fatality for typhoid fever outbreaks.

The amebic dysentery organisms have the property to resist chlorine. To destroy these pathogenic bacilli, it takes a dose of 25 p.p.m. chlorine or greater. When dry, they die fairly rapidly. The incubation period for this disease is from 18 to 30 days.

A study was made of rainfall and the relation of storm water to the outbreak. The prevailing belief is that a very heavy rainfall caused the closing of a float valve which prevented the storm water from backing up into the hotel. This valve, when it closed, also prevented the sewage water from the hotel flowing into the sewer. The dirty water backed up into the risers and built up a high pressure in

the sewer main which caused excessive leakage around a wooden plug in the overhead sewer. The large amount of drippings from the defective main collected into the iced water tank and was pumped throughout the hotels. The heavy rainfall came about 7 in the evening when the sewage of hotels is normally heavy.

Hotel X had the largest number of cases and it also had the largest number of guests eating at the hotel.

These papers were discussed by Abel Wolman, Chief Engineer, Maryland State Department of Health. He pointed out that this epidemic affected the adults and the wealthy. Several national lessons may be obtained from this outbreak. He said that it was remarkable to find how few professional persons considered cross connections unwise and how many were unaware that cross connections regulations exist.

Tall buildings in large cities are virtually vertical cities in themselves. The vertical cities in the midst of one large city were responsible for the safety of the lives of about 85,000 persons. Yet no technical person was employed in the hotels familiar with the management's health obligations. A full time sanitary service is far more important than the full time services of uniformed conductors in the lobby of these hotels.

Little typhoid fever was reported in the past outbreak. This may be due to the large residual of chlorine carried in the city water.

There was an epidemic of amebic dysentery in a Chicago hotel five years previous. At that time it was blamed on food handlers. In accordance with present investigations, the previous outbreak may have been a water borne epidemic.

He told of another case in which the outbreak was due to a real cross connection in a factory. At this time typhoid fever did occur. The plant manager required more water for his plant needs, so he made the cross connection.

Mr. Wolman closed his discussion with a statement of Prof. Jordan that environmental control is still important. "Things cannot be left to take care of themselves."

The papers and comments on the amebic dysentery outbreak proved of such interest to those present that in order to follow out the program schedule, it was necessary to cut down on the time for a round table discussion on taste and odor control. This latter discussion was participated in by John R. Baylis, Albert Eckert, G. R. Spaulding, N. J. Howard and A. F. Mellen.

Water Purification Dinner

Over three hundred persons attended the annual Water Purification Division Dinner at the Hotel Commodore on June 5.

"Bill" Orchard was master of ceremonies of the native home grown W. P. D. Minstrels, a group of singers consisting of Jack Butler, Joe Wafer and Joe Wrench of the Industrial Chemical Sales Company; George Norcom, Chairman of the Division; George Haggeter, Alan Johnstone and Ed Reilly, of Wallace & Tiernan Company; and Ed Orchard, brother of the illustrious Bill. The diners were also entertained by The Four Hawaiians from the Club Chez, and Anna Reichl, soprano, Station WOR.

During the dinner, Mr. Norcom as Chairman of the Division, presented an attractive fountain pen desk set to Harry E. Jordan, who served as Secretary of the Division for many years and who was honored by being selected as the new President of The Association.

*FINANCE AND ACCOUNTING DIVISION**Tuesday, June 5, Morning*

The first session of the Finance and Accounting Division opened on Tuesday morning with E. E. Bankson, of J. N. Chester Engineers, Pittsburgh, Pa., Chairman of the Division, presiding. The first paper read was on "Changes in Federal Tax Laws Affecting Water Companies," by Louis D. Blum, Certified Public Accountant, New York City, and Secretary of the Division.

A written discussion of this paper was read by B. J. Lechner, of the Erie, Pa., Water Department, in the absence of J. Schwartz, of the Public Service Commission of New Jersey.

"Taxation of Municipal Water Works," was briefly presented by A. G. Kamplain, Meter Service Company, Valparaiso, Ind.

This paper was discussed by Emile J. Fricker, E. E. Bankson, J. H. Murdoch, Jr., D. C. Grobbel, L. M. Rebsamen and R. W. Esty.

In the absence of F. C. Hamilton, who was unable to be present, C. J. Alfke, Comptroller, Hackensack, N. J., Water Company, spoke on the subject of "Property Record for Investment in Fixed Capital."

A paper by Hal F. Smith, Head Clerk, Water Consumers' Accounts, Detroit, Mich., Department of Water Supply, outlined "Work Incentives—with Particular Reference to Their Application to Municipal Water Works."

The final paper of the session was by W. P. Adams, Public Utilities Division, Burroughs Adding Machine Company, Detroit, Mich. In the absence of Mr. Adams, the paper was read by P. H. Hutchinson, of the Company.

The Finance and Accounting Division Luncheon

At noon on Tuesday the members of the Finance and Accounting Division had a luncheon with about 25 present. The speakers were Abel Wolman, Editor of *The Journal*; E. E. Bankson, Chairman of the Division, and J. H. Murdoch, Jr., the Chairman-Elect. Mr. Bankson announced the names of the officers for the ensuing year as:

Chairman—J. H. Murdoch, Jr., Uniontown Water Company, Washington, Pa.

Vice-Chairman—D. C. Grobbel, Secretary, Board of Water Commissioners, Detroit, Mich.

Secretary (Re-elected)—Louis D. Blum, Certified Public Accountant, New York City.

Directors—Charles J. Alfke, Comptroller, Hackensack Water Company, Weehawken, N. J., and E. E. Bankson, J. N. Chester Engineers, Pittsburgh, Pa.

Wednesday, June 6, Afternoon

The second and final session of the Finance and Accounting Division was held on Wednesday afternoon, the Chairman being Daniel C. Grobbel, Secretary to the Detroit, Mich., Board of Water Commissioners.

The "Financial History of the Water Department of the City of New York," was the subject of a paper by Joseph Goodman, Deputy Chief Engineer of that Department.

The second paper was by E. V. Williamson, Public Utility Accountant, Charleston, W. Va., on "Uniform Classification of Accounts suitable for Municipal and Private Plants." The author of the paper was formerly Chief Statistician, Public Service Commission of West Virginia, and is a former Chairman of Classification and Accounts Committee of the National Association of Railway and Utilities Commissions.

This paper was discussed by F. W. Schulz, Assistant Treasurer and Comptroller, Community Water Service Company.

The subject of "The Federal Securities Act in Relation to the Financing of Water Companies," was treated in a paper by Berne H. Evans, Attorney-at-Law, Harrisburg, Pa.

ABSTRACTS OF WATER WORKS LITERATURE

FRANK HANNAN

Key: American Journal of Public Health, 12: 1, 16, January, 1922. The figure 12 refers to the volume, 1 to the number of the issue, and 16 to the page of the Journal.

Ice Made of Water Treated with Caporit. VAN DER WALLE, N. Geneesk. Tijdschr. v. Nederl.-Indie, 1932, 72: 1759-69. From Bull. of Hygiene, 8: 6, 437, June, 1933. In Celebes, ice is made of well water passed through coal filters and disinfected with Caporit. To ensure practical freedom from bacteria in ice from river water, 5 mgm. of Caporit per litre of water was required. *ortho*-Tolidine test showed only traces of chlorine in ice from water treated 24 hours with Caporit.—Arthur P. Miller.

The Effect of Ammonia on Chlorine Fixation in Water. II. The Mechanism of Chlorination with Preammonization. M. L. KOSCHKIN. Ztschr. f. Hyg. u. Infektionskr., 1933, 115: 99-109. From Bull. of Hygiene, 8: 7, 500-501, July, 1933. Ammonia added to water before chlorine lessens the capacity of the water to fix chlorine, but increases the chlorine's bactericidal power. Ammonia added at same time as chlorine acts somewhat differently. This is not to be explained by theory that chloramines are produced. Author thinks that it might be explained on assumption that ammonia combines with substances which are thus rendered incapable of absorbing chlorine.—Arthur P. Miller.

Chemical and Biological Considerations Affecting the Control of Swimming Pools. J. H. COSTE. London County Council Ann. Rep., 1931, 4: 3, 196-200. From Bull. of Hygiene, 8: 7, 501, July, 1933. On an average, each not very clean adult adds 0.8 gram of nitrogen and 1.3 grams of chloride to swimming pool water. Best way to keep pool water in condition is to clarify with alumina and soda, then to filter through sand, and finally to chlorinate.—Arthur P. Miller.

Purification of Drinking Water with "Carbosteril." M. JAENICKE. Gesund. Ing., 1932, 55: 585. From Bull. of Hygiene, 8: 8, 556, August, 1933. "Carbosteril" process combines chlorination by means of stable chlorine compound, dechlorination with active carbon, and filtration. Filter is flat nickel-plated brass funnel with filter cloth stretched over its mouth and a rubber tube attached to its stem. It is immersed in the chlorinated water to which carbon has been added 15 minutes after chlorine compound. After further 15 minutes, water is siphoned off through filter.—Arthur P. Miller.

The Reduction of Corrosion in Water Pipe. EDWARD S. HOPKINS. *The American City*, 48: 10, 51-53, October, 1933. Baltimore treats water with lime to retard cold water corrosion. For past two years, egg-shell coating of calcium carbonate precipitate has been maintained, with pH value of 7.9. To test its effectiveness, corrosive properties of cold water in two large office buildings were studied. From the data tabulated it is clear that no aggressive carbon dioxide is present and that water with pH value at saturation point of calcium carbonate deposits corrosion-retarding coating. In one building iron content of water was unchanged, while in older (28 years), it increased by 0.01 p.p.m. Other tests disclosed that pH value suffered no reduction after passage though 1500 miles of pipe lines and a double set of balancing reservoirs. Treatment must be continuous, to give the protection necessary. Cost of lime treatment maintaining pH of 7.9 was found to be for year 1932, 14 cents per million gallons; for period 1922-1931, 21 cents per million gallons.—*Arthur P. Miller.*

Method of Crossing a Tidal Stream with a Water Main. WILLIAM J. LUMBERT. *The American City*, 48: 10, 54-55, October, 1933. At Scituate, Massachusetts, it was necessary to lay 10-inch water main across South River. Transite pressure pipe, composed of asbestos fiber and Portland cement combined under pressure, was used. Soil conditions were such that corrosion would have started on any metal exposed. Tests and continued use of transite pipe have proven that it is not attacked by corrosion, either from water inside, or from salt water, or mud, outside. Galvanic action would be absent in this type of non-metallic pipe. Method of laying, involving bolting together of 23 lengths of transite pipe, securing it in cradle, and then pulling the whole assembly into trench, is described.—*Arthur P. Miller.*

Maintenance, Reading, and Billing for a Metered Water System. J. S. STROHMYER. *The American City*, 48: 11, 37-41, November, 1933. Very complete description of system in use in Baltimore for maintaining and reading water-meters, and for billing customers. Two pages of cuts of forms are given.—*Arthur P. Miller.*

A New Criminal in the Taste and Odor Field. *The American City*, 48: 11, 44, November, 1933. Hackensack Water Company, in northern New Jersey, has found that fugitive electric currents may cause tastes and odors in water supplies. Grounding of electric wires to water pipes was found sometimes to discolor the water, making it blue, green, or red; and, in other cases, produced metallic tastes. Such tastes and odors were not uniformly present throughout the day, but were noticeable at certain well defined hours. Ground wires from lights or electric equipment were found attached to water piping in the cases studied.—*Arthur P. Miller.*

The New All-Electric Filtration and Pumping Plant at Easton, Pa. C. H. VIVIAN. *The American City*, 48: 11, 46-48, November, 1933. This up-to-date plant of Lehigh Water Company, uses alum, lime, and activated carbon in purification. Ammonia is added at the influent end of clear well and chlorine

at effluent end. Ratio of ammonia to chlorine is at present 1:4. At suction pit of high-lift pumps, secondary chlorine and ammonia are applied. Laboratory, complete with modern equipment for chemical, bacteriological, and microscopical tests, is part of plant.—*Arthur P. Miller.*

The New Zeolite Softening Plant at Lancaster, Ohio. The American City, 48: 12, 41-44, December, 1933. Lancaster, with population of 19,000, now has largest zeolite softening plant in Ohio. Water, drawn from two wells by two automatically controlled 24-inch pumps, is delivered to Aer-O-Mix unit, which aerates water and oxidizes iron. Two fully-equipped filters, each of 900 gallons per minute capacity, follow, and then three softeners, each of 1 m.g.d. capacity, using Crystalite, a synthetic zeolite. Softening run is from 7½ to 8 hours and water is reduced to zero hardness. After the run, softeners are drained and brine pumped into each unit. Brine and wash water are drained out slowly, after which, softeners are given one slow, and one fast wash. To softened water is added one-fourth its volume of filtered, but non-softened, water, before delivery to service pumps. Common salt for regeneration is purchased in carload lots. Raw water has total hardness of 360 and clear well water, of 80. Iron is reduced from 2.7 to 0 p.p.m.—*Arthur P. Miller.*

Fort Wayne, Indiana, Completes New Filtration Plant and Pumping Station. R. L. McNAMEE. The American City, 48: 12, 47-49, December, 1933. Additional supply has been developed from St. Joseph River. Complete project includes two impounding dams, pumping station, and several large feeder mains from filtration plant. At purification works, facilities are provided for aeration, chemical mixing, coagulation, clarification, carbonation, settling, and filtration. Coagulation tanks are equipped with paddle mechanisms designed to build up and maintain satisfactory settling floc. Gas from coke-fired producer generator is burned beneath steam boiler, and stack gases after being scrubbed, dried, and compressed, are delivered to carbonation tanks. Owing to small available area, settling basins are constructed as two-story tanks, over which aerators constitute third story.—*Arthur P. Miller.*

Installing a 60-Inch Cast Iron Water Main as Part of an Emergency Relief Program. The American City, 48: 12, 59-60, December, 1933. Description of extension to water system of Buffalo, New York. Main passes under Erie Canal through tunnel 218 feet long.—*Arthur P. Miller.*

Results of Improvements in the Neodesha Water Filtration Plant. FRED K. VANCE. The American City, 49: 1, 47-48, January, 1934. Improvements, including softening, were voted by Neodesha, Kansas, in 1930. This plant now, from turbid, highly polluted river water, furnishes safe drinking water with average hardness of 80 p.p.m. Flexibility permits use of alum, lime, soda ash, ammonium sulphate, chlorine, carbon dioxide, and activated carbon at suitable points, through machines. Each unit of plant is described. Increased water rates were necessary to carry additional operating cost and increased fixed charges.—*Arthur P. Miller.*

Protecting a Water-Works Intake. The American City, 49: 1, 48, January, 1934. Fort Smith, Arkansas, intake in Poteau River, about two miles from its confluence with Arkansas River, was endangered by cutting away of bank by Arkansas River. In collaboration with railroad company and other agencies, 6000 feet of rock revetment were constructed.—*Arthur P. Miller.*

Day Labor in Covington, Kentucky, Built Needed Water-Works Improvements. The American City, 49: 1, 62-64, January, 1934. Describes construction of new meter house, new connection to reservoir, and new line to city. Day labor was used as much as possible. In meter house have been installed three chlorinators and two ammoniators.—*Arthur P. Miller.*

Journal of the New England Water Works Association, 46: 4, December, 1932.

Outline of the Springfield Water Works. ELBERT E. LOCHRIDGE. 323-26. Development of Springfield, Mass., water supply system dates from incorporation of Springfield Aqueduct in 1798. Since 1910, Little River has furnished water for the city, and recently completed Cobble Mountain project, with 2 reservoirs and total storage of 25.3 billion gallons, has resulted in maximum utilization of original supply. Revenue of \$270,000 per year is realized by City for use of water power to generate electricity.

Construction of the Cobble Mountain Dam of the Springfield Water Works. HARRY H. HATCH. 327-44. Dam, located in narrow gorge of Little River, creates reservoir of 22.83-billion-gallon capacity, covering 1,134 acres. Material from earth and rock cut in spillway on southern slope of Cobble Mountain, 1,150 feet from dam, was used in construction. Hydraulic fill method was employed in placing practically all of the earth fill, material being either excavated, transported, and placed by water, or brought dry to dam site and then placed by water. The article is replete with data, construction problems, and unique photographs.

The West Parish Filtration Plant of the Springfield Water Works. HERBERT F. SALMOND. 345-55. Plant consists of control house, with connecting tunnel to sedimentation basin, laboratory building, aerator, ten slow sand filters, six old filters, sand court, etc. Treated water shows 95 percent reduction in bacterial content, with all samples tested showing negative for *B. coli* in 1-cc. portions. Alum is used to reduce the color. Filtering up to 24 m.g.d. the net cost for operation, maintenance, and interest during 1931 amounted to \$16.84 per m.g.

Hydro-Electric Power Development at Cobble Mountain in Connection with the Springfield Water Supply. HERBERT A. MOODY. 356-64. City of Springfield has leased to Turner Falls Power and Electric Co. all the power it can generate from storage capacity in Cobble Mountain and Borden Brook Reservoirs, amounting to maximum of 2.9 billion cubic feet. Gross head is 460 feet. Plant capacity is 23,000 k.w. at minimum effective head of 330 feet. Maximum capacity is 33,000 k.w., with wheel discharge of 1,100 second-feet, or 24.2 second-feet per square mile for the 45.5 square miles of drainage area. This is a typical "run of the river" plant. Among the unusual physical features is the differential surge tank, which is of contracted orifice type. Frost cover is omitted. Air compressor on thermostatic control causes air currents to mix warmer water coming through tunnel with colder water outside to maintain temperature above freezing. **Powdered Activated Carbon**

in Water Purification. Discussion of paper by F. E. STUART, 46: 3, 312. 365-69. Experience of operators has demonstrated that, under normal conditions, best results are obtained by applying the carbon before the filters, rather than to raw water, as proposed by author. **The Inch-Foot Method of Charging for Public Fire Protection Service.** FRANK J. GIFFORD. 370-72. Cost of that portion of water works involved in fire protection in a small town like Dedham, Mass., represents 60 percent of the total. The charge per inch-foot of pipe distribution system, with annual allowance per hydrant for maintenance, is considered the most equitable yet devised. Example: 50 feet of 12-inch pipe equal 600 inch-foot units. Charge per hydrant is based upon average annual cost of maintaining all hydrants. **Aëration in Water Treatment.** HERMAN ANDERSON. 373-79. In addition to 4 primary reasons for aëration, (a) removal of objectionable volatile odors of organic origin, (b) reduction of CO_2 and H_2S gases, (c) oxidation of ferrous iron and manganese, and (d) restoration of dissolved oxygen content, a fifth major reason for aëration is fine division and thorough mixing attainable when air and chemical coagulants are simultaneously introduced. This has proven effective with water high in color. Description of Aër-O-Mix, an aërating device of the diffused air type is given. **Mechanical Conditioning of Treated Water.** R. S. RANKIN. 380-88. Survey of various types of mixing devices in operation in filter plants leads to following conclusions: (1) present periods of mixing are too short; 30 to 60 minutes for coagulation, and 60 to 90 for softening being required; (2) chemical dosage may be reduced with efficient flocculation equipment; (3) present types of mixing basins are difficult to operate so as to secure prolonged mixing without the occurrence of short-circuiting, breaking up of floc, high loss of head, excessive power consumption, or inefficient mixing effect. The Flocculator shows promise of producing the best results at minimum cost of operation. **Maximum Daily and Hourly Water Consumption in American Cities.** A. PRESCOTT FOLWELL. 389-95. Tabulated results of questionnaires received from 361 cities ranging from Detroit to Helmetta, N. J., pop. 700, on maximum hourly, daily, and monthly consumption, with their relations to the average. **The Quality of Impounded Water Supplies.** HARRISON P. EDDY. 396-405. Lawrence, alone of Mass. cities, obtains its water from grossly polluted river. All others procure clean upland supplies. Location of reservoir determines quality of water. Limestone regions yield hard water; storms falling in denuded areas add high turbidities; and swampy land adds color. Sanitary protection of watershed is essential. Storage, if not too prolonged, improves sanitary quality. Intake ports should be located at various levels so that the water need be drawn neither from the top, where algae are numerous, nor from the bottom, with its decomposed organic matter and high iron and manganese content. Aëration and chlorination may be sufficient, but corrosive waters require additional treatment with soda ash or lime. Filtration, followed by chlorine or ammonia-chlorine, and with every step under strict laboratory supervision, is preferable.—T. F. Donahue.

Journal of the New England Water Works Association, 47: 2, June, 1933.
Standardization of Hydrant Markings. SIDNEY S. ANTHONY. 103-6. Committee of Maine Water Utilities Association recommended following marking

of fire hydrants, to prevent overloading by fire chiefs: Class A (green tops and nozzle caps) will have sufficient capacity to supply 1000 g.p.m. with residual pressure of 10 pounds per square inch; Class B (orange), not less than 500 g.p.m.; Class C (red), insufficient capacity to supply 500 g.p.m. with 10 pounds residual pressure. **Hydrant Pressure and Flowage Tests at Portland, Maine.** LEAVITT R. SMITH. 107-10. Procedure for testing hydrants in order to obtain capacity for standardization of marking. **Inspection and Maintenance of Gate Valves.** C. W. MOWRY. 111-14. After several years of neglected valve tests, 22 per cent of valves in one water works system were found defective. Cleveland Water Dept. inspects and operates all valves in distribution system the full travel, checking the turns, once a year. Inspectors should check location, accessibility, and operating condition and determine whether valves are open. Sprinkling systems have failed to function during fires due to closed valve on supply line. **Maintenance of Gate Valves in Boston.** GEORGE H. FINNERAN. 115-21. Procedure for locating, marking, testing, and repairing gates. During winter months coarse salt is spread around covers of larger gates to prevent accumulation of ice and snow. **Joint-Leakage Tests on 16-Inch Ball and Socket Pipe at Haverhill, Mass.** HERBERT C. CROWELL. 122-23. Leakage test on 16-inch ball and socket pipe crossing Merrimack River and connecting Haverhill high-service system with Bradford water system with static pressure of 115 pounds showed reduction in leakage from 106 gallons per hour on September 6 to 0 on September 27. Meter remained on line for six weeks with no further loss recorded. **Historical Notes on a Line of 10-Inch Cast Iron Pipe Laid in 1854, Pennichuck Water Works, Nashua, N. H.** D. C. CALDERWOOD. 124-28. When removed for replacement by 24-inch line, this pipe, cast in Nashua, was found in good condition. Horizontally cast, the iron was fine-grained, the casting symmetrical, and while thickness and weight conformed to present day Class A pipe, recommended for pressures under 43 pounds, pipe had sustained constant pressure of 45 to 55 pounds with occasional maximum of 80 pounds. Slight tuberculation and sediment had reduced effective diameter to $9\frac{1}{4}$ inches. Carrying capacity was relatively unchanged. **Field Tests of Large Meters.** NELSON BOARDMAN. 129-30. Loss due to installation of meter of too great capacity may be eliminated by first testing the line. Replacement of defective 4-inch with accurate 3-inch meter resulted in increase in quarterly revenue from \$41 to \$514. **Some Electrical Kinks in Water Works Practice.** J. H. READ. 131-32. Description of simple device for ringing alarm at pumping station when reservoir is full, with other applications of electricity, including use of salt velocity method of water measurement. **The Construction of the Cobble Mountain Diversion Tunnel.** HARRY H. HATCH. 133-52. Second article on construction features of Springfield, Mass., project describes diversion tunnel to divert flow of Little River during construction of Cobble Mountain Dam, to control $1\frac{1}{2}$ billion gallons water in reservoir below draft line of power tunnel at el. 830, and to aid, if necessary, in discharging extreme floods. **New England's Classic Contributions to Hydraulic Science.** CHARLES W. SHERMAN. 153-63. Brief biographical sketches of some important contributors to hydraulic science, including LOAMMI BALDWIN (1780-1838), called the "father of Civil Engineering in America," STORROW, FRANCIS, noted for his weir formula, CHESBROUGH,

builder of water tunnels, SHEDD, DAVIS, MILLS and others. **The Great Storm of September 16 and 17, 1932.** GEORGE V. WHITE. 164-83. Storm which surpassed in magnitude all storms back to October 3-4, 1869, caused little damage and consequently received little newspaper comment. Extreme rainfall recorded was 12.31 inches in 19 hours at Westerly, R. I. This excess followed a long period of drought. **Experiences with Water Main Cleaning.** ARTHUR T. CLARK. 184-89. Tuberculation may be retarded, or prevented, by maintaining pH value at which calcium carbonate equilibrium exists in water, which may be determined by marble test. Cleaning, in conjunction with chemical conditioning of water, will check subsequent tuberculation. Pitometer deflection curves for an 8-inch pipe showed pipe coefficient of 0.75 before cleaning and of 0.87, after tuberculation was removed. Value of C in the Chezy formula increased from 63 to 103.5. For insertion of cleaning machines, "Y" branches at head of section cleaned have been used successfully. **Fire Protection Classification.** GEORGE W. BOOTH. 190-94. In the "Schedule for Grading Cities and Towns with Reference to the Fire Defenses and Physical Conditions" adopted by the National Board of Fire Underwriters in 1916, water supply led the list of factors with percentage value of 34. Since adequacy and reliability of water system are all important, steam equipment should be available as reserve where pumping is done by electric or other power.—T. F. Donahue.

Journal of the New England Water Works Association, 47: 3, September, 1933. **General Description of Bridgeport Hydraulic Company's System.** SAMUEL P. SENIOR. 213-15. System supplies Bridgeport, Westport, Fairfield, Stratford, and Shelton, Conn., by gravity from 3 reservoirs with combined capacity of 12 billion gallons. Small centrifugal pumps, with 25-h.p. motors, deliver into elevated stand pipes for high sections. Rigid state laws aid in preventing pollution of watershed. Reforestation is practiced extensively. **Method of Operation of the Bridgeport Water Distribution System.** D. H. HALL. 216-18. System supplies about 25 m.g.d. to 33,000 services, 33 percent metered. All industrial services are metered. Systematic inspection of premises of domestic consumers who are on flat rate basis eliminates waste and reduces per capita consumption. Fire Underwriters' report in 1931 commended adequacy and reliability of system. Pressure is satisfactory; arteries and secondary feeders well arranged. **Steps in the Purification of the Bridgeport Water Supply.** FRANK C. BARROWS. 219-22. In addition to long storage period, water has, since 1911, been chlorinated. In 1932-3, ammonia has been used to overcome slight taste and odor. Normal chlorine dosage of 3.5 pounds per m.g. is increased in spring, or after heavy rainfall. Inspection of watershed, occasional application of copper sulphate, and use of ammonia-chlorine insure safe water. Bridgeport had no deaths from typhoid in 1932. **Watershed and Forestation Work of the Bridgeport Hydraulic Company.** WILLIAM C. POLLITT. 223-28. Since 1907, more than 1,700,000 pine and fir trees have been set out on watershed. While of little value in preventing erosion and runoff, trees surrounding the reservoirs create a favorable customer reaction and yield satisfactory monetary return. **Relation of Forests to the Evaporating Power of the Air.** PAUL W. STICKEL. 229-38. Data presented show

that, even in very small openings, almost twice as much water will be evaporated as beneath forest cover. Trees so shade ground, that duff and soil are never heated to high temperatures attained in the open, which reduces evaporation. It is impossible to compare quantitatively the saving thus effected with the loss by intussusception and transpiration. **Wakefield Water Supply.** ROBERT SPURR WESTON. 239-47. Following the drought 1930, when 50.34 m.g. had to be taken from Boston Metropolitan Supply, to augment Crystal Lake supply to Wakefield, Mass. (pop. 16,318), well field has been partially developed in vicinity of Town Farm gravel pit, near Wakefield Brook, a tributary of Saugus River. Total available supply will be over 1 m.g. d., adequate to 1945. Crystal Lake water has been chlorinated since 1915. Because of increasing pollution, high chloride, color, and bacteria, water purification plant, with aerators and slow sand filters, was installed in 1927. Approximately 50 percent of color was removed. Although filter effluent was safe, small dose of chlorine was added as an extra precaution. Cost of purification including fixed charges was \$31.01 per m.g. for 1932. **On the Determination of Odors and Tastes in Water.** GORDON M. FAIR. 248-72. Organs of taste are confined to the mouth, in particular to the tongue. There are four well circumscribed kinds of taste: sour, salty, bitter, and sweet. Other sensations are due to odors, temperature, touch, or chemical sensation. Frequently one ascribes to taste physiological response which actually is one of smell reaching olfactory organs through passage connecting nose and mouth. When testing for odors, light sniffing produces better results than deep breathing. Instead of arriving at threshold value of odors in water by diluting sample with odor-free water (SPAULDING, GULLANS, et al.), odor of undiluted sample may be captured in atmosphere overlying water and diluted with odor-free air. Dilution may be accomplished in standard gas burette. Mercury is satisfactory confining fluid, as it does not take odors into solution. Limited capacity of burette led to development of "twin-sphere osmometer" with 220-cc. volume of displaceable odor. Tests of air dilution method against water dilution method have yielded identical pO values. **Advances in Iron Coagulation and Coagulants.** E. L. BEAN. 273-79. Elimination of high cost through development of chlorinated copperas has brought ferric compounds into favor as coagulants. Favorable results have been obtained in removal of color. Ferric coagulation can be accomplished over pH range from 3.8 to 10, although under specific conditions there may be a mid-zone in which coagulation is slow. **Pipe Linings and Friction Coefficients.** ELSON T. KILLAM. 283-95. Obvious advantages of pipes with permanently smooth lining led to determination of HAZEN-WILLIAMS c for new pipes with various interior surfaces. Values of c varied from 120 for cast iron (pit cast) to 160 for pipe with bitumastic lining centrifugally applied. Available data on old pipe are meager; but ordinary tar-dipped cast iron, carrying active water for 50 years, may through severe tuberculation show reduction in c from 130 to 30. **Waterborne Disease in New York State.** EARL DEVENDORE. 298-312. Reduction in recorded cases of typhoid fever in New York State during past twenty years has been adversely affected by sporadic waterborne outbreaks, some of great magnitude, resulting from breakdown of water purification processes, or from pollution introduced through cross-connections with auxiliary industrial, or fire, supplies. Typical cases are cited, and need

for coöperation between local and state health officers is stressed.—*T. F. Donahue.*

Ueber den Nitratgehalt der Tiefenwässer. (The Nitrate Content of Deep Waters.) F. ROHWER. *Festschrift WILHELM SALOMON-CALRI, Sonderband d. Geol. Rundsch.*, 33a: 315-331, 1933. Abstract in *Geol. Zentr.*, 50: 2, 99-100, 1933. Author concludes that large increase in nitrates in waters from collecting-well in Fredericksburg water works at Pforzheim during 1920 (from 0 to 36 p.p.m.) and in one of the deep wells (to 52.8 p.p.m.) was not due to pollution; but that nitrate originates in uppermost soil, where and when climatic and vegetal conditions are favorable to the activities of nitrate-forming bacteria. Nitrate thus formed is leached from the soil and moves downward in the water-bearing beds. Because these conditions vary with the seasons, amount of nitrate entering the aquifer varies, and hence there is fluctuation in amount of nitrate in well water.—*A. N. Sayre, courtesy David G. Thompson.*

Die geologischen Grundlagen der Wasserversorgung im Saargebiet. (The Geologic Basis of the Water Supplies of the Saar District.) R. DRUMM. 52, Neunkirchen (Saar), 1933. Abstract in *Geol. Zentr.*, 49: 7, 380, June, 1933. Geology of the Saar Basin is discussed, with reference to water-bearing properties of the various rocks.—*A. N. Sayre, courtesy David G. Thompson.*

Aufsuchung von Wasser mit geophysikalischen Methoden. (Searching for Water by Applying Geophysical Methods.) J. KOENIGSBERGER. Reprint from "Erganzung-Heft für angewandte Geophysik," 3: 4, 463-525, 1933. (Akademische Verlagsgesellschaft m. b. H., Leipzig, 1933. Table of contents and summary are given in English. Discusses application of geophysical methods or determining occurrence and also quantity and quality of ground water, porosity of rocks, and structures controlling ground water. Describes chiefly electric resistivity methods, but also seismological and radioactivity methods, geophone for tracing underground streams, and inferences from earth and water temperatures and from humidity of subsurface atmosphere. Discusses the Mansfield water and oil finder and states that it is not easy to recognize a physical basis for the conditions that are claimed. States that no attitude is taken regarding the divining rod and related questions because only physical, and not physiological, phenomena and methods are considered.—*O. E. Meiner, courtesy David G. Thompson.*

Une intéressante captation d'eau dans le Puys-de-Dôme. (An interesting water supply in Puys-de-Dôme.) U. C. *La Nature* 271-72, 1933. A large supply of water is obtained at the bottom of unconsolidated volcanic materials that fill the Pliocene valleys of the Auvergne.—*F. G. Wells, courtesy David G. Thompson.*

Hydrogeological Investigations in the Region of Tuapsai, Black Sea Coast. V. PCELINCEV. [Russia], U. S. S. R., United Geol. & Prosp. Serv., Trans. fasc. 171. 37 pp. and map. Moscow, 1931. (Russian; Engl. summ. p. 37.) Region of Tuapsai is underlain chiefly by Lower and Upper Cretaceous,

Eocene, and Quaternary deposits, with a few outcrops of dacite and Upper Jurassic limestone. Series of complex folds trends parallel to main ridges, in a N.W.-S.E. (Caucasian) direction, accompanied by minor folds, faults, and rather large thrusts. Limited supplies of good water are obtainable from the cement-stone series in lower division of the Upper Cretaceous, but recent alluvial gravels yield the best supplies.—*S. W. Lohman, courtesy David G. Thompson.*

Die alkalischen Quellen in ihrer geochemischen Bedeutung. (Alkaline Springs and Their Geochemical Significance.) H. HARRASSOWITZ. *Zeitschr. f. Kurortwissenschaft*, 2: 211-216, 1932. Abstract in *Geol. Zentr.*, 50: 3, 153, September, 1933. Alkaline springs are those in which sodium and bicarbonate predominate. Springs were examined in Germany, France, and adjoining regions and it was found that high mineral content does not necessarily accompany high temperature. Alkaline waters invariably originate in silicate rocks and have undergone enrichment in sodium by processes of absorption of potassium and of alkaline earths. Frequency with which free carbonic acid occurs is attributed to magmatic origin of the water.—*A. N. Sayre, courtesy David G. Thompson.*

Experience with Anthracite Coal as a Filter Medium for Water Softening. C. P. HOOVER. *Water Works and Sewerage*, 80: 11, 394 November, 1933. Based on experiments by HOMER G. TURNER and G. S. SCOTT and by M. A. FARRELL, and in virtue of its (a) lower specific gravity, (b) more angular shape, and (c) greater uniformity in size, following claims are made for anthracite coal *versus* sand for filter beds:—(1) reduction of nearly one-half in wash water velocity; (2) better removal of turbidity; (3) greater bed porosity; (4) greater surface, and (5) greater vertical uniformity. Also as result of these properties, (6) greater floc penetration, (7) less surface clogging, (8) longer filter runs for given turbidity removal, and (9) greater efficiency generally, as shown by better removal of color, odor, turbidity, excess chlorine, and bacteria. Results of test of anthracite in one filter at Columbus, Ohio, are summarized. At \$8.47 per ton, delivered, it cost \$43.45 less to equip filter than with sand. Filter has been operating satisfactorily since August 1932. No difference has been observed between coal filter effluent and that from sand filters. After 13 months operation, there has been no lumping or cementing together of anthracite, but considerable incrustation. Sample from just below surface showed effective size of 0.95 mm. and uniformity coefficient of 1.2. Material as received showed effective size of 1 mm. and uniformity coefficient of 1.6; it is therefore evident that finer particles of coal have been carried to bed surface. When first put in service, maximum wash rate required to float anthracite bed was 12 to 15 inches per minute, but, since incrustation, rate of 20 inches per minute can be used.—*R. E. Noble.*

Tastes, Chlorine, and Chloramines in Water Purification. CHAS. H. CAPEN, JR. Part I. *Water Works and Sewerage*, 80: 12, 447-450, December, 1933. Deals with general problem of tastes, with relationship between temperature changes and chlorine requirement and its importance in practice. During

periods of receding water temperatures, margin is small, with chlorine alone, between residual necessary for safety and that which will cause chlorinous taste. **Part II.** Ibid., 81: 1, 31-33, January, 1934. Relates specific instance in substantiation of foregoing. Effect of ammoniation on chlorine consumption and cost of sterilizing are discussed. Summarized, chloramines appear destined to increase in favor. Ammonia seems to have been preponderatingly successful in prevention of chlorinous taste: its failures seem chiefly to have been in prevention of some unusual taste. Failure to meet unreasonable requirements has tended to obscure its real value. Author believes time will come, when question will not be whether, or not, to supplement chlorine with ammonia, but rather, where to inject the latter, what ratio to use, and at which seasons of the year.—*R. E. Noble.*

A Self-Liquidating Water Plant Improvement. CHAS. P. HOOVER. *Water Works and Sewerage*, 81: 3, 84-86, March, 1934. Describes installation of pneumatic system for conveying soda-ash from cars to storage, which replaces handling same in 200-pound burlap bags. Diagrams are given of chemical feeder with tell-tale arrangement which throws it out of operation when feed fails. Structural alterations included conversion of concrete tanks for soda solution to bulk storage bins for dry soda-ash. Savings given.—*R. E. Noble.*

Court Decision Relating to Public Health. *Public Health Reports*, 48: 32, 980-981, August 11, 1933. (Maryland Court of Appeals; *GORDON v. Commissioners of Montgomery County*, 164 A. 676; decided February 15, 1933.) Ordinance was passed requiring county permit before any cemetery should be operated, and providing that no cemetery should be so located as to permit drainage of water into any well, spring, etc. used for drinking purposes by human beings, or so as to endanger safety and health of residents in community. Plaintiff sought to prevent county from interfering with his effort to open and operate cemetery without obtaining permit. Court held ordinance valid.—*R. E. Noble.*

Changes in the Teeth of White Rats Given Water from a Mottled Enamel Area Compared with Those Produced by Water Containing Sodium Fluoride. W. H. SEBRELL, H. T. DEAN, E. ELVOVE, and R. P. BREAUX. *Public Health Reports*, 48: 17, 437-445, April 28, 1933. Drinking water from endemic mottled enamel area (Conway, S. C.), concentrated to one-tenth of its volume produced whitish incisors in white rats, followed by appearance of brown striations. Synthetic drinking water comparable to concentrated Conway water, and containing all ions found in Conway water in amounts greater than one-half of one p.p.m., excepting fluorine, caused no noticeable abnormality in teeth of white rats. Synthetic drinking water containing 150 p.p.m. of sodium fluoride caused loss of the normal orange color of incisors of white rats, followed by appearance of irregular brown spots, similar to changes produced by Conway water. Synthetic drinking water containing 500 p.p.m. of sodium fluoride was exceedingly toxic to young white rats and produced chalky white, brittle teeth in those surviving the acute toxic effect.—*R. E. Noble.*

Court Decision Relating to Public Health. Public Health Reports, 48: 16, 426-427, April 21, 1933. **State Water Commission Act held Unconstitutional.** (West Virginia Supreme Court of Appeals; DANIELLEY et al. v. City of Princeton, 167 S.E. 620; decided January 24, 1933.) State water commission directed City of Princeton to cease depositing sewage in certain creek or to install systems which would reduce, or eliminate, existing sewage pollution. Law provided that circuit court should review any order of commission, and that it should determine all questions arising on the law and render such judgment, or make such order, upon the whole matter as law and equity required. Supreme court of appeals held statute unconstitutional, because it committed executive powers to the judiciary.—*R. E. Noble.*

The Atlanta Water Sampler. PAUL WEIR and J. W. ALLEN. Water Works and Sewerage, 81: 3, 101-102, March, 1934. With limited personnel, collection of samples at frequent intervals from various points in plant for purpose of closely controlling effectiveness of each step in purification, presents great difficulty. In satisfactory, but inexpensive, automatic sampling device in use at Atlanta, water from any desired point is drawn continuously through $\frac{1}{4}$ -inch pipe to and through glass inspection chamber, by means of ejector operated from pressure main. Six such glass inspection chambers are mounted side by side in chemical application building, containing respectively:—(1) raw water; (2) water from either middle, one-third point, or one-quarter point, of mixing chamber; (3) effluent from mixing chamber; (4) water from sedimentation basin (just past maximum precipitation point); (5) effluent from sedimentation basin (applied water); and (6) filtered water. By this arrangement, operator has constantly before him in space of about four feet, trustworthy picture of condition of water at the various points. Diagram, sampling procedure, and detailed explanation given.—*R. E. Noble.*

Experiences with Chlorinated-Copperas as a Coagulant. L. C. BILLINGS. Water Works and Sewerage, 81: 3, 73-77. March, 1934. After three-month period of operation with chlorinated copperas and lime, careful and detailed comparison is made with corresponding three-month period in previous year when copperas and lime were used. Author attributes to chlorinated copperas following advantages:—(1) floc forms cleanly and of proper size; (2) floc is tough and strong; (3) rate of settling is favored by coarse suspended material, or by high bicarbonate alkalinity, in raw water; (4) floc ordinarily settles well and residual small floc going to filters is distinct and of sufficient volume to load sand beds well without building loss of head unduly; (5) coagulating effect is constant, regardless of considerable variation in pH (8.0 to 9.0); (6) for turbidities around 3,000 p.p.m., 0.5 g.p.g. chlorinated copperas will suffice, if pH is raised above 9.0, with caustic alkalinity of 5 to 10 p.p.m.; and (7) considerable saving in coagulant costs, averaging \$10.50 per day at Dallas plant during 3-month period.—*R. E. Noble.*

Municipal Water Supply Rights. LEO T. PARKER. Water Works Engineering, 86: 18, 872, September 6, 1933. Limitations to legal rights and authority of municipality to supply water to its inhabitants, construct water systems,

establish rates, extend its service, and the like, are expressed by state laws. Power to fix rates for public utilities, whether privately or municipally owned, rests primarily with state legislature. Where municipality owns its water works, it has right to fix reasonable rates, which shall be applicable to small and large consumers alike. Rates must be reasonable, just, uniform, and non-discriminatory. Regulation and control of rates of water plant owned and operated by municipality, is vested in city government, subject to judicial review of reasonableness of city ordinances pertaining thereto. Those engaged in a public calling have always been under the extraordinary duty to serve all comers, while those in a private business may always refuse to sell if they please. Profits earned by a municipally owned water works plant, which serves only portion of population of municipality, cannot be legally divided among total population. State statutes conferring authority to impose taxes must be strictly construed. The law guarantees equally to every one its protection; but does not require that a tax must in all instances and under all conditions be equal. Either municipal water department, or private water company, may be compelled to extend its mains, when service in water district contemplated by the city charter is inadequate. Fact that water company has voluntarily extended its service beyond such district does not obligate the company further to extend its lines, where it is proved no adequate return can be earned on the investment. City is liable for damages which occur to water users' equipment as result of cutting off water supply, where it is shown that such damages arose from negligence on part of city employees. Although contract exists between water company and city by which company agrees to furnish water to extinguish fires, and company breaches that contract, by negligently allowing its pipes to become obstructed, or otherwise, water company is not liable. City is not liable in damages to property owner whose property is destroyed by fire as result of negligence on part of municipal officials, in failing to provide adequate water supply.—*Lewis V. Carpenter.*

Indebtedness for Improvements. LEO T. PARKER. *Water Works Engineering*, 86: 16, 781, August 9, 1933. Contract for equipment is valid, if it is clearly specified that payment for such equipment is special obligation, payable exclusively from net revenue of water plant. Municipal funding warrants, signed and issued by mayor, or another official, without authority of city council are void and unenforceable. New tax levies may not be made to limit of amount specified in new law, where, when this amount added to old indebtedness, their sum exceeds aggregate limitations specified in old law. Private property may be subject to taxation for purpose of obtaining money for making public improvements, such as construction and maintenance of water works system. Moreover, rule of law is applicable, although property taxed is not especially benefited by improvement. Where property owner agrees to pay assessments against his property for local improvements, such as installation of water mains, he cannot later repudiate the obligation after improvements are completed. Agreement, whereby privately owned water company contracts with municipality to furnish water at low rates for use of public buildings, hydrants, and the like, and city, in return, agrees to refrain from taxing certain property of Water Company, is valid and enforceable, if both city and

water company fulfill their obligations; but is rendered void, if for any reason, such as public utilities commission's ruling, water company is permitted to increase the water rates. Bond issue for water works improvements is not rendered invalid where officials decide to construct an improvement different from that described to voters who approved bond issue. When assessing valuation of portion of extensive water system, utilized by several municipalities, for purpose of taxation in any one municipality, assessment must be strictly in accordance with provisions of state laws.—*Lewis V. Carpenter.*

When Sewage Disposal Effects Damage. LEO T. PARKER. *Municipal Sanitation*, 4: 8, 272. August, 1933. Courts have held that either municipality, or state, is bound adequately to take care of its sewage without injury or inconvenience to individuals. In *State of Wisconsin v. State of Illinois*, 53 S. Ct. 671, Chicago having failed in this respect, to detriment of Wisconsin citizens, it was sought to enforce on Illinois remedial action. Supreme Court held state must construct works. **City and Private Industry Liable for Water Pollution.** *Johnson v. City of Fairmont*, 247 N.W. 572. City's septic tank effluent was discharged into stream which also received waste from two canning factories. Suit was filed against city and canning companies, asking that both be held jointly liable. Defendants pleaded non-liability unless negligence proven. Judgment for plaintiff. **Proving Liability is Technical.** *City of Enid, Okla., Champlin Ref. Co., and Eason Ref. Co.* Private property owner sought damages for contamination of creek by sewage of near-by city and by waste from two refineries, contending that two wells were polluted and odor nuisances caused. Plaintiff was awarded \$1500.00 damages from Champlin Refinery. City was exonerated. Well water showed presence of phenol, a refinery by-product. **Complaining Party Must Prove Water Pollution.** *O'Hair v. California*, 20 P. (2d) 375. Waste waters of packing company and city sewage were conveyed through septic system of municipality and discharged without owner's consent into slough on property used for grazing purposes. Owner in suit filed for damages failed to establish any of his claims for injuries sustained. City was exonerated. **New Land Owner Not Entitled to Recover Damages.** *Bowie Sewerage Co. v. Vann*, 59 S.W. (2d) 180. New owner of private property sought damages for discharge, nine years previously, of sewage into his stream. Higher court exonerated municipality. **Polluted Water Kills Fish.** *Bales v. City of Tacoma*, 20 P. (2d) 860. Fish hatchery operator brought suit against city for loss of fish through alleged contamination of stream feeding hatchery. Defence contended that garbage and sewage complained of had been dumped into stream during many years before construction and operation of hatchery. Award of \$2500.00 damages was sustained by higher court.—*R. E. Noble.*

The Economics of Pool Operation. P. H. HUEDEPOHL. *Municipal Sanitation*, 4: 8, 268, August, 1933. Many people contract diseases from swimming in polluted streams. Water unfit for drinking purposes is certainly unfit for bathing and swimming. A public aware of these facts will favor pool swimming. Modern pool construction considerations: (1) Retention of competent engineer. (2) Initial investment and operating efficiency necessary for a good

pool and degree of patronage to be expected. (3) Accessibility, visibility, adjacency to highway, and advertising potentiality of site: parking space, beach, and play-ground should be provided. (4) For contest purposes, pool 82½ feet long will conform with standard A.A.U. regulations. Unit construction eliminates congestion, especially in outdoor pools. (a) Kiddies' section, with depths of 6 to 24 inches. (b) Non-swimmers section, depths 3 to 5 feet, usually 70-75 percent of total water area of all units: play apparatus is placed here. (c) Swimmers unit. For economy and for guarantee of safe water, filters and sterilizers are necessary. Fill-and-draw pools are being eliminated by installation of filters and chlorinators and by prohibitory legislation. Circulation system must be capable of maintaining constant flow in all parts of the pool, and designed to give constant residual chlorine throughout. Heating methods include automatic gas heaters, live steam, exhaust steam, and low pressure boilers, depending upon local conditions. Recirculation and refiltration economize heat. E.g., 100,000-gallon pool, heated monthly instead of three times weekly, represents net annual saving of \$2,566.00. Bath house arrangement is important. Water consumption is about 10 percent of pool capacity per day, due to evaporation, backwashing filters, and splashing. Each person will use about 25 gallons in showers, lavatories, etc. Advertising should be about 4 percent of gross revenue. Rapid growth is shown in numbers of pools: in the U. S. in 1900, there were 67 private and public pools; in 1913, 550; to-day, 12,000. Venereal, ocular, aural, and intestinal infections have been traced to polluted pools: in 1929, a new skin and foot disease was traced to public and private beaches and pools. To avoid skin irritation, treatment chemicals need careful control. Chloramine is free from irritating effects and gives high residual. Pool management should enforce:—cleansing shower, with soap, before entrance to pool; foot bath with sufficient disinfectant; examination of bathers; and sterilization of walk-ways, shower floors, ladderways, and lavatories. Pools should be constructed to make possible definite control. At all times operators should maintain records of all necessary data. Properly controlled swimming pool water will show less suspended matter and less bacteria than most drinking water.—*R. E. Noble.*

Preliminary Report on Ground-Water Resources of Northern Virginia. R. C. CADY. Virginia Geol. Survey, Bull. 41. 48 pp. 1933. Records of about 1,300 wells furnish data for determining some of more practical aspects of water-bearing characteristics of rocks in this area, which include crystalline pre-Cambrian, folded sedimentary rocks of Paleozoic age, conglomerate sandstone, shale and diabase of Triassic age, and unconsolidated sediments of Coastal Plain.—*R. C. Cady.*

A Short Method for Calculating Moisture Percentages. NELSON MCKAIG, Jr. Science, 75: 1954, 612-614, June 10, 1932. Describes a short cut method for calculating moisture percentages on a certain type of calculating machine, with two to four less operations than are usual.—*D. G. Thompson.*

Capillary Retention of Liquids in Assemblages of Homogeneous Spheres. W. O. SMITH and others. Physical Review, 36: 3, 524-530, August, 1930.

Pore space of an assemblage of uniform spheres was initially saturated with liquid and then slowly drained. Retained liquid was measured.—V. C. Fishel.

Geology of the Hot Springs District, Virginia. ARTHUR BEVAN. (Abstract) Geol. Soc. Am. Bull. 44: 1, 72, February 28, 1933. Numerous thermal springs occur in this area of folded rocks, from Ordovician to Devonian in age.—W. H. Monroe.

The Pseukups Mineral Springs. I. IGNATOVITCH. [Russia], U. S. S. R., United Geol. & Prosp. Serv., Trans. fasc. 97. 187 pp., map, Moscow, 1932. (Russian, Engl. summ.). Describes numerous hot and tepid springs at above health resort, situated in lower part of Dantov Gorge (Mineral Valley) in Caucasus Range, about 55 km. south of town of Krasnodar. Springs flow from sandstones of the Goriachi Kliuch series (Eocene) and from Miocene deposits. Temperature and quality of the waters were best determined by sinking numerous bore holes, many of which became flowing wells. Total discharge from springs and bore holes is about 470,000 litres per day. Saline-alkaline springs are common, and some contain considerable iodine and bromine. Hydrogen sulphide content in some cases is as much as 325 mg. per litre. Gas jets accompany some springs and contain CH_4 , N_2 , CO_2 , H_2 , and rare gases.—S. W. Lohman, courtesy David G. Thompson.

Schwankungen des Grundwasser-standes in Norddeutschland während der letzten Jahrzehnte, ihre Ursachen und ihre limnologische, geologische, und wirtschaftliche Bedeutung. (Fluctuations in the Ground-Water Levels in North Germany during the Last Decade, Their Causes and Their Geologic, Limnologic, and Economic Significance). AUGUST THIENEMANN. Archiv f. Hydrobiologie, 24: 345-428, Stuttgart, 1932. Abstract in Geol. Zentr., 49: 3, 155, April, 1933. Author brings evidence to show that in twenty-year period, ground-water levels in the area have risen 5 to 35 m. This rise is due to precipitation 10 percent above normal, and has resulted locally in bogging land.—A. N. Sayre, courtesy David G. Thompson.

Radium- und mesothoriumhaltige natürliche Gewässer. (Natural Waters Containing Radium and Mesothorium). V. CHLOPIN, and W. VERNADSKY. Zeitschrift für Elektrochemie und angewandte physikalische Chemie, Berlin, 38: 8a, 527-530, 1932. Abstract U. S. Bur. Mines, Geophysical abstracts, 48: 793, (mimeographed) April, 1933. Discusses results of detailed investigations by Radium Research Institute of Leningrad of deep ground water in oil-bearing regions and of mineral springs of Soviet Union.—R. M. Leggett, courtesy David G. Thompson.

Tiefbohrungen in der Vorderpfalz. (Deep Wells in the Palatinate). C. MEHLIS. Palatina, Heimatbeilage der Pfälzer Zeitung (Speyer), abstract in Geol. Zentr., 49: 3, 155, 1933. Author reports on success of deep wells in the Rhine Plain and in the Haardt.—A. N. Sayre, courtesy David G. Thompson.

NEW BOOKS

[Hydrology]. SHIZUO ABE. This book of 70 pages, entirely in Japanese, relates to general subject of hydrology. It contains chapters as follows: (1) What is hydrology? (2) Circulation of water; (3) Water in the earth; (4) Origin of water in the earth; (5) Pressure and movement of water in sand and gravel; (6) Precipitation; (7) Evaporation; (8) Transpiration; (9) Seepage; (10) Investigation of river discharge; (11) River discharge; (12) Runoff relations; (13) Conclusion. Literatures.—O. E. Meinzer, *courtesy David G. Thompson*.

[Hydrology of the Tanna Basin as Affected by the Tunnel]. SHIZUO ABE. This volume of 160 pages, with numerous diagrams and maps, is in Japanese, except brief abstract in English. Describes topography, geology, meteorology, forest conditions, streams, and springs of Tanna Basin. Correlates stream and tunnel flow with geologic structure and with fluctuations of water levels in wells. Based on records for period June, 1927, to end of 1928, it concludes that flow of water in tunnel can be traced to ground water in neighborhood, and that this flow greatly affects discharge of rivers.—O. E. Meinzer, *courtesy David G. Thompson*.

The Iodic Springs in the Western Part of the Turkmenian S. S. R. G. SMOLKO. [Russia], U. S. S. R., United Geol. & Prosp. Serv. Trans. fasc., 175: 72, Moscow, 1932. (Russian, Engl. summ.). Describes 60 springs, 37 issuing from fissures, 19 from vents of mud volcanoes, and 4 fed by descending ground water. Temperatures range from 19° to 60½° C., and all contain large amounts of chloride, sodium, potassium, calcium, and magnesium. Iron oxide is noticed in nearly all the springs, and from 0.011 to 0.040 gr. per litre of iodine is present in many of them. Sulfate is present in small amounts. Many of the waters are believed to be connate. Rocks of the area are marine and continental sediments of Miocene to Quaternary age that have been folded into domes and extensively faulted.—S. W. Lohman, *courtesy David G. Thompson*.

Ground-water Resources of Western Tennessee. FRANCIS G. WELLS. U. S. Geol. Survey Water Supply Paper 656. 311 pp. 1933. Describes geology and ground-water conditions in Tennessee, west of northward reflex of Tennessee River. Paleozoic section is briefly described. Character, extent, water-yielding properties, and chemical composition of derived water of the McNairy sand, Cretaceous age, and of the Wilcox group, Eocene age, are treated. Laboratory tests of 113 samples of sand and 176 water analyses are listed. Report contains a quantitative study of the Memphis Water Supply.—F. G. Wells, *courtesy David G. Thompson*.

Ground Water in the Paleozoic Rocks of Northern Alabama. WILLIAM DRUMM JOHNSTON, Jr. Alabama Geol. Survey, Spec. Rept. No. 16. 414 pp. and accompanying tables. 1933. Ground water conditions in 25 counties in northern Alabama, where many kinds of Paleozoic sedimentary rocks occur.

Rocks are divided into 35 formations, that range in attitude from horizontal to steeply dipping and are faulted. Sections of report are devoted to a division of the area into physiographic provinces, to description of principal limestone caves, and to discussion of water-bearing properties of the different formations. A chapter for each county describes the physiography, geology, and ground water. Vol. 2 contains tabular data on 1,100 wells and 300 springs.—*W. D. Johnston, Jr., courtesy David G. Thompson.*

Hydrogeological Explorations in the Kuchuk-Koi and Kikeneiz Regions of the Southern Coast of the Crimea. Hydrogeological Explorations in the Lemeny Regions on the Southern Coast of the Crimea. S. N. MIKHAILOVSKI, and V. TH. PCELINCEV. [Russia], U. S. S. R., United Geol. and Prosp. Serv. Trans. fasc., 119 and 186. 4 maps, 11 pl. Moscow, 1932. (Russian; Engl. summ.). Both reports include detailed geologic and paleontologic descriptions, descriptions of important water-bearing horizons, and descriptions of wells and springs. Conditions causing landslides are described in detail at end of each report.—*S. W. Lohman, courtesy David G. Thompson.*

Hygienische Leitsätze für die Trinkwasserversorgung. Beratungen im Preussischen Landesgesundheitsrat. Berlin: R. Schoetz. 495 pp. M. 18. From Chem. Abst., 27: 1433, March 20, 1933.—*R. E. Thompson.*

Supply of Water. T. H. P. VEAL. London: Chapman and Hall, Ltd. 242 pp. 15s. Reviewed in Chemistry and Industry, 1933, 16. From Chem. Abst., 27: 1433, March 20, 1933.—*R. E. Thompson.*

Über die Reinigung von Oberflächenwasser mit Aluminum Sulfat für technische Zwecke. THEODOR HENNIG. Thesis, Dresden, 1931. From Chem. Abst., 27: 1433, March 20, 1933.—*R. E. Thompson.*

Über den Keimgehalt von Mineralwässern. KARL LANG. Thesis, Giessen, 1932. 8 pp. From Chem. Abst., 27: 1433, March 20, 1933.—*R. E. Thompson.*

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Public Utility Regulation. WILLIAM E. MOSHER and FINLA G. CRAWFORD. Cloth: 6 x 9 inches; pp. 612. New York and London: Harper and Brothers. \$5. Reviewed in Eng. News-Rec., 110: 846, June 29, 1933.—*R. E. Thompson.*

Reinforced Concrete Water Towers, Bunkers, Silos, and Gentries. W. S. GRAY. 256 pp. London: Concrete Publications Ltd. 10s. Reviewed in Engineering and Contract Record, 47: 641, June 28, 1933 and in Eng. News-Record, 111: 387, September 28, 1933.—*R. E. Thompson.*

Hydraulics. HORACE W. KING and CHESTER O. WISLER. 3rd edition, revised. Cloth: 6 x 9 inches; pp. 292. New York: John Wiley and Sons, London: Chapman and Hall, Ltd. \$2.75. Reviewed in Eng. News-Rec., 111: 477, October 19, 1933.—*R. E. Thompson.*

The Fresh-Water Algae of the United States. GILBERT M. SMITH. Cloth: 6 x 9 inches; pp. 716. New York and London: McGraw-Hill Book Co., Ltd. \$6. Reviewed in Eng. News-Rec., 111: 477, October 19, 1933.—*R. E. Thompson.*

Robert Smith, Esq., of the City of New York, is the author of the following works, published by the New York Public Library, Astor, Lenox and Tilden Foundations, 1882.

1. *History of the City of New York, from its first settlement to the present time.* New York: New York Public Library, Astor, Lenox and Tilden Foundations, 1882.

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CONSTITUTION AND BY-LAWS OF THE AMERICAN WATER WORKS ASSOCIATION

(Adopted June 25, 1929)

CONSTITUTION

ARTICLE I

NAME

The name of this Association shall be "The American Water Works Association."

ARTICLE II

The object of this Association shall be the advancement of knowledge of the design, construction, operation and management of water works, and its membership shall consist of persons interested in such matters, having such qualifications and classifications as shall be from time to time prescribed in the By-Laws.

ARTICLE III

BOARD OF DIRECTORS

SECTION 1. The Governing Body of the Association shall be a Board of Directors, hereinafter called the Board.

SECTION 2. The Board shall consist of:

- a. The President of the Association.
- b. The Treasurer of the Association.
- c. One Director to be elected by each Section of the Association.
- d. One Director to be elected by the members of the Water Works Manufacturers Association.
- e. The latest living Past President of the Association.
- f. The Chairman of the Committee on Water Works Practice.
- g. The Chairman of the Publication Committee.

SECTION 3. The terms of Directors and Officers shall start at the beginning of the last day of the annual convention at which they are elected, and shall terminate at the beginning of the last day of the annual convention at the expiration of their terms.

SECTION 4. The President of the Association, and the Directors

elected by the Sections of the Association will not be eligible for re-election for consecutive terms.

SECTION 5. The Officers of the Association shall be the Officers of the Board.

SECTION 6. The functions of the Board shall include the following:

a. Establishing policies for the Association, and for the Executive Committee, and for the Officers.

b. Providing for the general administration of the affairs and property of the Association.

c. Fixing the time and place of the annual and other conventions of the Association as provided in the By-Laws.

d. Preparing and enforcing for the conduct of the business of the Association, By-Laws not in conflict with this Constitution, and amending the same.

SECTION 7. A quorum of the Board shall consist of a majority of its members.

SECTION 8. Regular meetings of the Board shall be held during the annual convention of the Association, on such days as may be decided by the Board. Other meetings may be held at the direction of the President, or at the request, in writing, of five members of the Board, and on such notice as shall be provided in the By-Laws.

ARTICLE IV

NOMINATION AND ELECTION OF OFFICERS AND DIRECTORS

SECTION 1. There shall be a meeting of the Board held in January of each year at which a Nominating Committee consisting of the Directors representing the various Sections of the Association shall meet under the Chairmanship of the President, and shall nominate one, and may nominate two candidates for each of the offices of President and Treasurer, provided that any candidate so nominated shall be an Active Member of the Association, and shall have been a member of the Executive Committee prior to the adoption of the present Constitution and By-Laws, or a member of the Board of Directors since its adoption, and shall signify willingness to accept the nomination. This Committee shall report its list of nominees to the Board before the close of its January meeting, and the list shall then be mailed to the membership before February first of that year.

At any time prior to noon on the first day of March of each year additional nominations may be made by request to the Secretary, signed by at least twenty-five Active-Members, and upon receipt of

such request, the Secretary shall, after acceptance of the nomination by the candidates, add such names to the ballot prepared by him. The nominees of the Nominating Committee shall be so designated on the ballot for each office, and the names of all nominees shall be arranged in alphabetical order.

When more than one name is nominated for either office, the election shall be by letter ballot. Each Active Member shall be entitled to vote for one candidate for the office of President, and one candidate for the office of Treasurer. The ballot shall be prepared by the Secretary and mailed to each Active Member of the Association prior to April first in each year, and shall state the name and residence of each candidate.

The ballot shall be sealed separately in a special ballot envelope, and the latter shall be enclosed in a larger envelope, and mailed to the Secretary. The signature of the member voting shall appear on the outer envelope.

When a letter ballot is necessary, the Secretary together with two or more Tellers appointed by the President shall meet at a time and place directed by the President, and shall open and count all ballots cast by persons entitled to vote. No ballot shall be counted if received later than noon of the seventh day previous to the beginning of the annual convention of the Association. When only one candidate is placed in nomination for each office to be filled, the report of the Nominating Committee shall be considered as an election.

The report of the Tellers for the election of the incoming President and Treasurer shall be declared by the President at the annual convention on certificates of the Tellers. The candidates who shall have received the highest number of votes cast for the several offices shall be declared elected. If there be a tie vote the President shall order a ballot to be taken at the annual convention to decide which of the candidates who have received the same number of ballots shall be chosen.

The terms of the Officers so elected shall be for one year beginning with the last day of the annual convention at which they are elected to the beginning of the last day of the next annual convention, or until their successors shall have been chosen.

In case of a vacancy in the office of President, the office shall be filled by the latest living Past President for the unexpired term of such office.

In the case of a vacancy in the office of Treasurer, the Executive

Committee shall appoint an Active Member to fill the office for the unexpired term.

SECTION 2. One Director to represent each Local Section shall be nominated and elected by the members of the Section at an annual Section meeting, and in the same manner as the Presiding Officer of that Section is elected. The manner of such election shall receive the approval of the Board. The Director so elected shall be an Active Member.

The term of each Director so elected shall be for three years beginning with the last day of the annual convention immediately following his election, except as stated below:

The following Local Sections shall elect their Directors during the year previous to the annual convention of the Association in 1930, and such Directors shall serve from the said annual convention until the annual convention in 1931:

North Carolina, Canadian, Wisconsin, Rocky Mountain, Indiana.

The following Local Sections shall elect their Directors during the year previous to the annual convention of the Association in 1930, and such Directors shall serve from the said annual convention until the annual convention in 1932:

Pacific Northwest, Missouri Valley, Kentucky-Tennessee, Central States, New York.

The following Local Sections shall elect their Directors during the year previous to the annual convention of the Association in 1930, and such Directors shall serve from the said annual convention until the annual convention in 1933:

California, Montana, Minnesota, Illinois, Florida, Four-States.

When new Local Sections are constituted, the initial term of the Directors representing such Sections shall be determined by the Board.

In the case of the retiring, from any cause, of a Director representing a Section, before his term is completed, the governing body of the Section shall designate his successor, who shall serve for the unexpired portion of the term.

SECTION 3. One Director shall be nominated and elected by the members of the Water Works Manufacturers Association. His term of office shall be for three years beginning with the last day of the annual convention immediately following his election.

ARTICLE V

The Executive Committee and Officers as constituted under the previous Constitution shall remain in office, and continue to direct the affairs of the Association until the end of the annual convention in 1930.

The nominations and elections as laid down in the Constitution and By-Laws, accepted by the Association at its annual convention in 1929, shall proceed prior to the annual convention in 1930, and the successful candidates shall take office at the close of the latter convention.

Except as mentioned above the Constitution shall take effect at the end of the annual convention in 1929.

ARTICLE VI

AMENDMENTS

Proposals to amend this Constitution shall be submitted in writing to the Board, signed by at least ten Active Members of the Association.

The Board shall consider the proposals and the proposers shall be notified of the Board's opinion in regard thereto not later than the first day of March. The proposers may then withdraw their proposals, accept any change suggested, or insist on the original form, sending their decision to the Secretary not later than the first day of April. The proposals, as accepted by the proposers, shall be mailed to the Active Members not less than twenty-one days before the annual convention. Proposals to amend this Constitution may also be made by the Board and shall be mailed to the Active Members not less than twenty-one days before the annual convention. All proposals shall be submitted for discussion at the annual convention. The Active Members there present may propose an amendment or amendments thereto, and all proposals together with any such amendment or amendments shall be printed on a letter ballot to be submitted to the Active membership. The Secretary shall issue the letter ballot not later than two months after the annual convention.

On the written request of three or more members the letter ballot shall be accompanied by a statement giving reasons for and against the proposal edited by a Committee appointed by the Board, consisting of an equal number of members favoring and members opposing the proposal.

The letter ballot shall be returnable to the Secretary not later than three months after the annual convention. Three Tellers appointed by the Board shall forthwith count the ballots and report the result to the Board.

An affirmative two-thirds vote of all valid ballots shall be necessary for the amendment or repeal of any part of the Constitution.

The amendments as passed shall take effect at the beginning of the next calendar year except that changes affecting the tenure of office of an Officer of the Association shall not take effect until the next annual convention.

BY-LAWS

ARTICLE I

MEMBERSHIP

SECTION 1. The membership of the Association shall consist of Honorary, Active, Corporate and Associate Members.

SECTION 2. An Honorary Member shall be one whose practical or scientific knowledge in matters relating to water supply, and whose accomplishments in that field of endeavor shall entitle him to special recognition by the Association. Honorary Members shall have the same privileges as Active Members but shall not be required to pay any dues for the support of the Association.

SECTION 3. An Active Member shall be a superintendent, a manager, an official or employee of a municipal or private water works; a civil, mechanical, hydraulic, or sanitary engineer, a chemist, a bacteriologist, or any qualified person engaged or interested in the advancement of knowledge relating to water supplies.

SECTION 4. A Corporate Member shall be a Water Board, Water Commission, Water Department, Water Company or Corporation, National State or District Board of Health, or other body, corporation or organization engaged or interested in water supply work, and shall be entitled to one representative whose name shall appear on the roll of members and who shall have all the rights and privileges of an Active Member. This representative may be changed at the convenience and pleasure of the Corporate Member on written notice to the Secretary.

SECTION 5. An Associate Member shall be either a person, firm or corporation engaged in manufacturing or furnishing supplies for the operation, construction, or maintenance of water works.

SECTION 6. Any Association or Society which is primarily organized to promote the advancement of the art of water supply in any of its branches, and to furnish to its members information relating thereto, shall be eligible for designation by the Board as an Affiliate Association or Society of the American Water Works Association. Such Association or Society shall submit an application to the Board and upon the application receiving the approval of a majority of the Board, the said Association or Society shall remain an Affiliate at the pleasure of the Board. An Affiliate shall pay no dues, shall exchange publications, and its members who are qualified to become Active Members of the American Water Works Association may become so upon application for such Active membership as provided in the By-Laws, without payment of any initiation fee, but shall pay the yearly dues.

ARTICLE II

ADMISSION AND EXPULSION

SECTION 1. The Board, on its own initiative, or at the request of twenty-five members of the Association, may elect any qualified person an Honorary Member. This election shall take place at a regular meeting of the Board and shall be by ballot. Two negative ballots shall exclude.

Each Honorary Member shall receive an engrossed certificate of membership in that grade.

SECTION 2. Applications for Active, Corporate, or Associate membership shall be made on the blank forms provided by the Association. Each application shall embody a concise statement of the applicant's qualification for membership. All applications shall be forwarded to the Secretary who shall submit them to the Board.

An affirmative vote of a majority of the Board shall elect and the applicant shall become a member when initiation fees and annual dues shall have been paid.

SECTION 3. No member whose dues are in arrears for four months shall receive the publications of the Association until such arrears are paid. Members in arrears for one year shall be automatically dropped by the Secretary from the list of members.

SECTION 4. The Board may, for sufficient cause, temporarily or permanently excuse from the payment of annual dues, any member who from ill health, advanced age, or other good reason, is unable

to pay such dues, and the Board may remit the whole or part of dues in arrears, or accept in lieu thereof desirable additions to the library or collections.

SECTION 5. A member who has been dropped for non payment of dues may be re-instated by the Board on payment of the arrears. He shall then be entitled to receive such back numbers of the publications of the Association as may have been withheld from him on account of non payment of dues, and are available for distribution.

SECTION 6. Any member of any grade may be expelled from membership in the Association, by a three-quarters vote of the Board, taken by letter ballot, provided such member has been given a written statement of the charges preferred, and has been accorded an opportunity of a hearing before the Board.

SECTION 7. Any member may retire from membership by giving written notice to the Secretary, provided that he is in good standing.

ARTICLE III

FEES AND DUES

* SECTION 1. Each Active Member shall pay an initiation fee of five dollars, and annual dues of ten dollars, provided that any Active Member in good standing who has paid dues continuously for thirty years shall be exempt from payment of further dues. No initiation fee shall be required from a member in good standing of an Affiliate Association or Society, who has been elected as an Active Member.

* SECTION 2. Each Corporate Member shall pay an initiation fee of ten dollars, and annual dues of fifteen dollars.

* SECTION 3. Each Associate Member shall pay an initiation fee of ten dollars, and annual dues of twenty-five dollars.

SECTION 4. The fiscal year of the Association shall begin on January first, and terminate on December thirty-first. Annual dues shall be payable in advance, and shall be due on January first in each year. It shall be the duty of the Secretary to notify each member on or before December thirty-first in each year of the amount due from said member for the ensuing year.

SECTION 5. Any newly elected member shall be entitled to all of the publications of the Association that are distributed to its members during the year, or that part of the year, for which he has paid dues.

*(See note on page 13.)

*SECTION 6. Any newly elected member who qualifies by payment of dues between June 1, 1933, and December 31, 1933, shall not be required to pay an initiation fee under any membership grade. This Section shall be eliminated from the By-Laws on January 1, 1934.

ARTICLE IV

EXECUTIVE COMMITTEE

There shall be an Executive Committee of five members consisting of the President and four Directors. This Committee shall be chosen by the Board at its meeting at the annual convention.

The President of the Association shall act as Chairman of the Committee, or in his absence, the Committee shall choose a temporary Chairman from its members, and the Secretary of the Association shall act as its Secretary.

The duties of the Committee shall be to direct the administrative work of the Association and to carry out the policies of the Board between meetings of the latter.

A quorum of the Committee shall consist of three members.

ARTICLE V

DUTIES OF OFFICERS AND DIRECTORS

SECTION 1. The President shall have general supervision of the affairs of the Association, and shall preside at all conventions of the Association and meetings of the Board. In his absence he shall designate a Presiding Officer to act in his stead at such conventions or meetings. He shall be, ex-officio, a member of all Committees.

SECTION 2. The Board of Directors shall be the legal representatives of the Association, and as such shall have full control of the Association in regular convention. It shall make the necessary arrangements for the conventions, and shall have power to expend the funds of the Association, or to invest the same, but must not incur indebtedness beyond the funds in the hands of the Treasurer and Secretary. It shall hold a meeting during the last day, and also a meeting at least one hour before the opening session of each annual convention. Other meetings shall be held at the call of the President, or of any five members of the Board. Notice of all meetings shall be issued by the Secretary at least ten days in advance of such meetings to all members of the Board.

*Continued to December 31, 1934, by action of the Board of Directors.

At its meeting on the last day of the annual convention, the Board shall appoint a Secretary and an Editor which Officers shall serve until the close of the next annual convention, or until their successors shall have been appointed.

Except as otherwise provided in the Constitution and By-Laws, all questions before the Board shall be decided by a majority vote.

SECTION 3. The Treasurer shall have charge of the funds of the Association, and shall pay bills against the Association when certified by himself and the Secretary. He shall make a report of the expenditures and of the funds of the Association at the annual convention. He may, with the approval of the Board, establish a drawing account for the Secretary.

He shall be bonded at the expense of the Association, and to an amount to be determined by the Board.

He shall perform such other duties as may be assigned to him by the Board. (As amended August 15, 1930.)

SECTION 4. The Secretary shall be an Active Member of the Association. It shall be his duty to attend all conventions and meetings of the Association, and of the Board, prepare the business and duly record the proceedings thereof. He shall see that all moneys due the Association are collected, and shall promptly deposit the same to the credit of the Association. He shall certify to all bills against the Association, and once each month he shall forward to each member of the Board, a financial summary of receipts and disbursements.

He shall, at the annual convention, make a report of the receipts and of the condition and affairs of the Association.

He shall have charge of the books and records of the Association and shall supervise the work of all employees.

The books of the Association shall be audited annually by Certified Public Accounts, to be appointed by the Board.

He shall be bonded at the expense of the Association, and to an amount to be determined by the Board.

He shall perform such other duties as shall be assigned to him by the Board.

SECTION 5. The Editor shall have charge of the printing and distribution to all the members of the Proceedings and Transactions of the Association, and shall perform such other duties as shall be assigned to him by the Board. He shall be, ex-officio, a member of the Publication Committee, and of the Committee on Water Works Practice.

ARTICLE VI

CONVENTIONS OF THE ASSOCIATION

The annual convention of the Association shall be held at a time and place to be selected by the Board. Additional conventions of the Association may be held at such times and places as may be selected by the Board. Meetings of the Sections shall be held as determined by the Constitutions of the Sections. All conventions and meetings shall be conducted according to "Roberts Rules of Order."

Each member and guest present at any of the conventions of the Association shall pay a registration fee of such amount as may be determined by the Board.

ARTICLE VII

SECTIONS AND DIVISIONS

SECTION 1. Local Sections may be established by the Board on receipt of a written request to that effect signed by twenty Active or Corporate Members of the Association residing in the territory within which the Local Section is desired. The territory embraced by each Local Section shall be fixed by the Board.

SECTION 2. National Divisions consisting of superintendents, engineers, chemists, bacteriologists, and accountants or other classes of persons included in the membership of the Association may be established by the Board on the request of thirty members. Any member of the Association may register in any National Division of the Association in which he is interested.

SECTION 3. Such Local Sections and National Divisions which shall consist only of members of this Association in good standing shall elect their own Officers and Committees, and may make any rules for their government not inconsistent with the Constitution and By-Laws of the Association, but these rules must first be approved by the Board.

SECTION 4. Each Local Section as soon as established, and after its rules have been approved by the Board, may with its approval annually receive from the Treasurer of the Association for local use not more than twenty-five per cent of the annual dues paid to the Association by the members of the said Local Section as shown by the books of the Association on the first day of November of each year, unless the Board increases the amount allowed to any Local Section, the amount of such increase to be determined by the Board,

and to be allowed only when in the judgment of the Board the work undertaken by that Local Section is such as to be of material benefit to the Association. Unless the Board increases the amount allowed the total money received by any Local Section for any one fiscal year shall not exceed the sum of \$300. Local Sections having small membership shall be entitled to receive from the Association \$100 in any one fiscal year, even though the allotted twenty-five per cent of the annual dues paid to the Association by the members of the said Local Section does not amount to \$100.

Each National Division when established and its rules and Constitution have been approved by the Board, may with the approval of the Board, annually receive from the Treasurer of the Association a sum not exceeding \$100 for Division expenses.

The Treasurer of each Local Section or National Division shall forward to the Secretary of the Association his application endorsed by the Presiding Officer of the Section or Division for such portions of the said sums above specified as may be needed and upon receipt of such application the Secretary shall authorize the Treasurer of the Association to pay such sums to the Treasurer of the Section or Division. These moneys may be used by the Section or Division only in payment of necessary operating expenses.

At the end of each fiscal year the Treasurer of each Section and Division shall submit a certified copy of his accounts to the Secretary of the Association, the same being itemized and showing the balance on hand of funds received from the Association which will remain to the credit of such Section or Division until such Section or Division is dissolved or the Board shall otherwise order their return to the treasury of the Association.

SECTION 5. Any member of the Association who resides in a locality which is not included in the territory embraced by an existing Local Section, may upon written request to the Board be included in the membership of any Local Section. The Secretary of the Association shall notify the Secretary of the Local Section of the enrollment of the member.

Whenever a new Local Section is formed or an existing Local Section has its territory extended which will include in its territory the locality where such member resides, he shall automatically be included in the membership of such Local Section.

SECTION 6. Any Section or Division may be dissolved by the Board for reasons which it believes are good and sufficient.

ARTICLE VIII

PUBLICATIONS

All publications of the Association shall be issued under the direction of the Board and shall be copyrighted as far as is practicable and proper.

ARTICLE IX

COMMITTEES

SECTION 1. A Publication Committee shall be appointed by the Board at the annual convention of the Association. It shall consist of at least five members, at large, and its Chairman shall be ex-officio a member of the Board.

It shall have control of the publications of the Association, including the programs of its conventions and shall see that all publications and papers are edited before publication.

The Committee shall prepare rules which shall govern the preparation, presentation, acceptance, and publication of all papers and such other matters of a similar nature as the best interests of the Association may require.

SECTION 2. A Committee on Water Works Practice shall be appointed by the Board at the annual convention. It shall consist of at least five members, at large, and its Chairman shall be ex-officio a member of the Board.

Any resolution, report or publication which undertakes to establish in the name of the Association, or any of its Sections or Divisions, professional or technical standards, shall be submitted to this Committee, and it shall direct all such matters on behalf of the Association.

It shall give notice by publication to the membership of all such proposed standards and report its approval or disapproval of such to the Board.

It shall appoint such Sub-Committees as it may deem necessary to properly carry on its work.

SECTION 3. The Board shall appoint such other Committees as may be necessary to carry on the work of the Association.

ARTICLE X

The Board of Directors may amend these By-Laws in any manner not inconsistent with the Constitution by a two-thirds vote of those voting at any meeting of the Board or by sealed letter ballot, providing that a copy of such proposed amendment has been mailed by the Secretary to each member of the Board at least thirty days prior to such meeting or letter ballot.

PAST PRESIDENTS

*COL. J. T. FOSTER, Chicago, Ill.	1881-1882
*COL. J. T. FOSTER, Chicago, Ill.	1882-1883
*J. G. BRIGGS, Terre Haute, Ind.	1883-1884
*L. H. GARDNER, New Orleans, La.	1884-1885
*PETER MILNE, JR., Brooklyn, N. Y.	1885-1886
*B. F. JONES, Kansas City, Mo.	1886-1887
*J. T. FANNING, Minneapolis, Minn.	1887-1888
*A. N. DENMAN, Des Moines, Ia.	1888-1889
*J. H. DECKER, Salina, Kans.	1889-1890
*WILLIAM B. BULL, Quincy, Ill.	1890-1891
*J. M. DIVEN, Elmira, N. Y.	1891-1892
*G. H. BENZENBERG, Milwaukee, Wis.	1892-1893
JAMES P. DONAHUE, Davenport, Ia.	1893-1894
*WILLIAM RYLE, Paterson, N. J.	1894-1895
*W. G. RICHARDS, Atlanta, Ga.	1895-1896
*F. A. W. DAVIS, Indianapolis, Ind.	1896-1897
*JOHN CAULFIELD, St. Paul, Minn.	1897-1898
*JOSEPH A. BOND, Wilmington, Del.	1898-1899
*R. M. CLAYTON, Atlanta, Ga.	1899-1900
*C. E. BOLLING, Richmond, Va.	1900-1901
*WILLIAM R. HILL, New York, N. Y.	1901-1902
*C. H. CAMPBELL, Charlotte, N. C.	1902-1903
*L. N. CASE, Duluth, Minn.	1903-1904
*MORRIS R. SHERRERD, Newark, N. J.	1904-1905
*BENJAMIN C. ADKINS, St. Louis, Mo.	1905-1906
*DABNEY H. MAURY, Peoria, Ill.	1906-1907
GEORGE H. FELIX, Reading, Pa.	1907-1908
*D. W. FRENCH, Weehawken, N. J.	1908-1909
DR. WILLIAM P. MASON, Troy, N. Y.	1909-1910
JOHN W. ALVORD, Chicago, Ill.	1910-1911
*ALEXANDER MILNE, St. Catharines, Ont.	1911-1912
*DOW R. GWINN, Terre Haute, Ind.	1912-1913
ROBERT J. THOMAS, Lowell, Mass.	1913-1914
GEORGE G. EARL, New Orleans, La.	1914-1915
NICHOLAS S. HILL, JR., New York, N. Y.	1915-1916
*LEONARD METCALF, Boston, Mass.	1916-1917
THEODORE A. LEISEN, Detroit, Mich.	1917-1918
CHARLES R. HENDERSON, Davenport, Ia.	1918-1919
CARLETON E. DAVIS, Philadelphia, Pa.	1919-1920
BEEKMAN C. LITTLE, Rochester, N. Y.	1920-1921

* Deceased.

CONVENTIONS

	Place	Date	President
1	St. Louis, Mo.	March 29, 1881	J. T. Foster
2	Columbus, Ohio.	March 14-16, 1882	J. T. Foster
3	Buffalo, N. Y.	May 15-17, 1883	J. T. Foster
4	Cincinnati, Ohio.	April 15-17, 1884	J. G. Briggs
5	Boston, Mass.	April 21-23, 1885	L. H. Gardner
6	Denver, Colo.	June 23-25, 1886	Peter Milne, Jr.
7	Minneapolis, Minn.	July 13-15, 1887	B. F. Jones
8	Cleveland, Ohio.	April 17-19, 1888	J. T. Fanning
9	Louisville, Ky.	April 16-18, 1889	A. N. Denman
10	Chicago, Ill.	May 20-24, 1890	J. H. Decker
11	Philadelphia, Pa.	May 14-17, 1891	Wm. B. Bull
12	New York, N. Y.	May 17-19, 1892	J. M. Diven
13	Milwaukee, Wis.	September 5-9, 1893	G. H. Benzenberg
14	Minneapolis, Minn.	August 21-23, 1894	James P. Donahue
15	Atlanta, Ga.	May 28-30, 1895	William Ryle
16	Indianapolis, Ind.	May 26-28, 1896	W. G. Richards
17	Denver, Colo.	June 8-10, 1897	F. A. W. Davis
18	Buffalo, N. Y.	June 14-18, 1898	John Caulfield
19	Columbus, Ohio.	May 16-19, 1899	Joseph A. Bond
20	Richmond, Va.	May 15-18, 1900	R. M. Clayton
21	New York, N. Y.	June 17-22, 1901	Charles E. Bolling
22	Chicago, Ill.	June 10-13, 1902	Wm. R. Hill
23	Detroit, Mich.	June 23-26, 1903	Chas. H. Campbell
24	St. Louis, Mo.	June 6-11, 1904	L. N. Case
25	West Baden, Ind.	May 9-12, 1905	Morris R. Sherrerd
26	Boston, Mass.	June 26-30, 1906	Benjamin C. Adkins
27	Toronto, Ont.	June 17-21, 1907	Dabney H. Maury
28	Washington, D. C.	May 11-16, 1908	George H. Felix
29	Milwaukee, Wis.	June 7-12, 1909	D. W. French
30	New Orleans, La.	April 25-29, 1910	Wm. P. Mason
31	Rochester, N. Y.	June 5-10, 1911	John W. Alvord
32	Louisville, Ky.	June 3-7, 1912	Alexander Milne
33	Minneapolis, Minn.	June 23-27, 1913	Dow R. Gwinn
34	Philadelphia, Pa.	May 11-15, 1914	Robert J. Thomas
35	Cincinnati, Ohio.	May 10-14, 1915	George G. Earl
36	New York, N. Y.	June 5-9, 1916	Nicholas S. Hill, Jr.
37	Richmond, Va.	May 7-11, 1917	Leonard Metcalf
38	St. Louis, Mo.	May 13-17, 1918	Theodore A. Leisen
39	Buffalo, N. Y.	June 9-13, 1919	Charles R. Henderson
40	Montreal, Que.	June 21-25, 1920	Carleton E. Davis
41	Cleveland, Ohio.	June 6-10, 1921	Beekman C. Little

	Place	Date	President
42	Philadelphia, Pa.....	May 15-19, 1922	Edward Bartow
43	Detroit, Mich.....	June 21-25, 1923	W. S. Cramer
44	New York, N. Y.....	May 19-23, 1924	George W. Fuller
45	Louisville, Ky.....	April 27-May 1, 1925	Frank C. Jordan
46	Buffalo, N. Y.....	June 7-11, 1926	Harry F. Huy
47	Chicago, Ill.....	June 6-11, 1927	Allan W. Cuddeback
48	San Francisco, Calif.....	June 11-15, 1928	James E. Gibson
49	Toronto, Ont.....	June 24-28, 1929	William W. Brush
50	St. Louis, Mo.....	June 2-6, 1930	Jack J. Hinman, Jr.
51	Pittsburgh, Pa.....	May 25-29, 1931	George H. Fenkell
52	Memphis, Tenn.....	May 2-6, 1932	Ross L. Dobbin
53	Chicago, Ill.....	June 12-16, 1933	George W. Pracy
54	New York, N. Y.....	June 4-8, 1934	Malcolm Pirnie

OFFICERS, DIRECTORS AND STAFF

1934-1935

President

HARRY E. JORDAN, Chemical Engineer, Indianapolis Water Co., 113 Monument Circle, Indianapolis, Ind.

Treasurer

WILLIAM W. BRUSH, Editor, "Water Works Engineering," 24 W. 40th St., New York, N. Y.

Board of Directors

Term expires 1934

WALTER A. PEIRCE (Representing Wisconsin Section), Manager, Water Department, City Hall, Racine, Wis.

Terms expire 1935

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Sub-Committee 7K—Water Consumption

Sub-Committee 7L—Fire Prevention and Protection

Sub-Committee 7M—Hydraulics of Distribution System

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B-31—Code for Pressure Piping

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B-36—Wrought Iron and Wrought Steel Pipe and Tubing

F. N. SPELLER, Metallurgical Engr., National Tube Co., 1802 Frick Bldg., Pittsburgh, Pa.

C-1—Electric Wiring and Apparatus in Relation to Fire Hazard, Regulations for Representative of A. W. W. A. on Article 9, Committee on Grounding, of Electrical Code Committee.

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PUBLICATIONS ABSTRACTED

- Affiliated Engineering Societies of Minnesota—Bulletin
- American Chemical Society—Journal
- American City
- American Electro-Chemical Society—Proceedings
- American Forestry
- American Medical Association—Annual Index
- American Medical Association—Journal
- American Meteorological Society—Publications
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- American Society for Municipal Improvements—Proceedings
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- Canada Department of the Interior—Water Supply Bulletins
- Canadian Engineer
- Canadian Public Health Journal
- Canadian Water Works Association—Journal
- Chemical Abstracts
- City Reports (Misc.)
- Civil Engineering
- Cleveland Engineering Society—Journal
- Concrete
- Connecticut Association of Civil Engineers—Proceedings
- Contract Record & Engineering Review
- Dayton Engineers' Club—Publications
- Engineering and Contracting
- Engineering Association of the South—Proceedings
- Engineering News-Record
- Engineers' Club of Philadelphia—Journal

Engineers of St. Louis—Journal
Engineers' Institute of Canada—Journal
Engineers' Society of Western Pennsylvania—Proceedings
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Illinois Society of Engineers—Reports
Illinois State Water Survey—Bulletins
Indiana Engineering Societies—Proceedings
Industrial & Engineering Chemistry
Ingenieria Internacional (Published in New York)
Iowa Engineering Societies—Proceedings
Johnson National Drillers Journal
Journal of Bacteriology
Journal of Biological Chemistry
Kendall's Contractors' & Engineers' Monthly
Louisiana Engineering Society—Proceedings
Maryland-Delaware Water & Sewerage Association—Proceedings
Mechanical Engineering (Jour. Am. Soc. M. E.)
Missouri Water Works Association—Journal
Monthly Weather Review (U. S. Weather Bureau)
Municipal and County Engineering
New England Water Works Association—Journal
New Jersey Water Works Association—Proceedings
North Carolina Section, American Water Works Association—Journal
Ohio Conference on Water Purification
Ohio Engineering Societies—Proceedings
Ohio Water Works Association—Proceedings
Pennsylvania Water Works Association—Proceedings
Pennsylvania Water Works Operators Association—Journal
Power
Power Plant Engineering
Public Health Engineering Abstracts (U. S.)
Public Utility Reports
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Railway Age
Railway Maintenance Engineer
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Railway Review
Scientific Lubrication
South Jersey Association of Water Superintendents—Proceedings
Southeastern Section, American Water Works Association—Journal
Southwest Water Works Association—Journal
State Boards of Health—Reports and Bulletins (Misc.)
Texas Water Works Short School
U. S. Bureau of Agriculture—Bulletins and Circulars
U. S. Bureau of Census—Statistics
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U. S. Bureau of Standards—Bulletins, Circulars, Technical Papers, etc.
U. S. Dept. of Agriculture—Bulletins and Circulars

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D designates award of John M. Diven Memorial Medal
G designates award of John M. Goodell Prize
A designates member of Finance and Accounting Division
P designates member of Plant Management and Operation Division
W designates member of Water Purification Division

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D DONAHUE, COL. JAMES P. Retired. Hotel Blackhawk, Davenport, Iowa.	Apr. 16, 1884
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Joined

28, 1920	APW ARMSTRONG, C. G. R. Cons. Engr., Davis Bldg., Windsor, Ont., Canada.....	May 22, 1934
31, 1933	PW ARMSTRONG, JAMES W. Filtration Engr., City Water Dept., Lake Montebello, Hillen Road, Baltimore, Md.....	Mar. 12, 1910
23, 1933	W ARMSTRONG, KENNETH C. Supt. of Water Works, Empresas Publicas Municipales, Barranquilla, Colombia.....	Dec. 29, 1924
20, 1920	ARMSTRONG, ROGER W. 136 Hicks St., Brooklyn, N. Y.....	Apr. 8, 1916
23, 1925	P ARNOLD, ELMER L. Supt., City Water Works, Box 225, Glasgow, Mont.....	May 7, 1934
10, 1920	W ARNOLD, GERALD E. Water Purification Engr., San Francisco Water Dept., Millbrae, Calif.....	Sept. 30, 1933
2, 1934	APW ARNOLD, HALL. Supt., Municipal Light & Water, Madisonville, Ky.....	Mar. 14, 1932
31, 1927	AP ARNOLD, WILLIAM L. Auditor, San Gabriel Valley Water Co., 15 So. Garfield Ave., Alhambra, Calif.....	July 28, 1933
29, 1929	ASBELL, GEORGE H. Supt. of Water Works, Daytona Beach, Fla.....	July 12, 1932
5, 1927	PW ATKINSON, ASHER. City Engr., 49 Mine St., New Brunswick, N. J.....	Mar. 27, 1922
28, 1910	ATTERSALL, CHARLES F. Supt., Water Works, Winchester, Ky.....	June 7, 1910
11, 1930	W AUSTIN, E. J. City Engr. & Water Supt., Box 118, Hoquiam, Wash.....	Nov. 23, 1927
14, 1919	W AUSTIN, R. N. Chief Engr. & Mgr., Turbine Equipment Co., 73 King St., West., Toronto, Ont., Canada.....	May 12, 1925
24, 1928	W AVIRETT, MILTON D. Sales Mgr., Georgia Gravel Co., Columbus, Ga.....	July 28, 1933
30, 1918	W AYRES, LOUIS E., C.E., B.S. Ayres, Lewis, Norris & May, Cornwell Bldg., Ann Arbor, Mich.....	Nov. 16, 1916
7, 1932	PW BABBITT, HAROLD E. Prof. of San. Engineering, University of Illinois, 204 Engineering Hall, Urbana, Ill.....	June 7, 1916
28, 1922	W BACHARACH, E. W. Pres., E. W. Bacharach & Co., 616-17 Rialto Bldg., Kansas City, Mo.....	Apr. 29, 1924
14, 1918	W BACHMANN, FRANK. Dorr Co., Inc., La Salle-Wacker Bldg., Room 1838, Chicago, Ill.....	Feb. 4, 1915
8, 1909	BADGER, H. F. Sect., Board of Fire Underwriters of the Pacific, 914 Merchants Exchange Bldg., San Francisco, Calif.....	Aug. 1, 1925
10, 1925	APW BADLEY, HARRY W. Water Supt., 1123 N. Carroll St., Carroll, Iowa.....	May 22, 1928
22, 1930	PW BAHLMAN, CLARENCE. Water Purification Supervisor, Cincinnati Filtration Plant, California, O.....	Feb. 7, 1922
4, 1913	PW BAILEY, WM. T. Chemist, City Water Dept., Broadway Pumping Station, Council Bluffs, Iowa.....	Jan. 27, 1932
1, 1929	W BAIN, ERNEST B. 120 New Bern Ave., Raleigh, N. C.....	June 1, 1904
5, 1917	W BAITY, H. G. Prof. of San. & Munic. Engineering, University of North Carolina, Chapel Hill, N. C.....	May 15, 1923
7, 1922	W BAKER, M. N. 53 Oakwood Ave., Montclair, N. J.....	June 24, 1903
1934	PW BALDWIN, F. O. Supt., Water Purification Plant, Westover Hills, Richmond, Va.....	May 10, 1922
1927	PW BALDWIN, ROBERT L. Burns & McDonnell Engineering Co., 107 W. Linwood Blvd., Kansas City, Mo.....	Nov. 20, 1925
1916	W BALDWIN, ROBERT T. Sect., Chlorine Institute, Inc., 50 E. 41st St., New York, N. Y.....	July 28, 1924
1918	APW BALDWIN, T. H. City Engr., Cheyenne, Wyo.....	May 14, 1934
1921	BALL, EDMUND B. Managing Director, Glenfield & Kennedy, Ltd., Kilmarnock, Scotland.....	Jan. 26, 1924
	BALLOU, ARTHUR F. Engr., National Board of Fire Underwriters, 85 John St., New York, N. Y.....	Aug. 7, 1924

	Joined
APW BANERJEE, K. C. Exec. Engr., Public Health Dept., Bengal, 12A, Scott Lane, Calcutta, Bengal, India.....	May 13, 1920
P BANK, WILLIAM G. Asst. Engr., Bureau of Water, Newark, N. J.....	Dec. 16, 1919
APW BANKSON, ELLIS E. Cons. Engr., The J. N. Chester Engrs., 6562 Bartlett St., Pittsburgh, Pa.....	July 27, 1922
APW BARBOUR, FRANK A. Hyd. & San. Engr., 1120 Tremont Bldg., Boston, Mass.....	May 21, 1906
BARCLAY, W. E. Supt., Dept. of Water & Electricity, Aurora, Ill.....	May 13, 1918
W BARDWELL, C. M. 2056 Fairfax Ave., Denver, Colo.....	July 6, 1926
W BARDWELL, R. C. Supt., Water Supply, Chesapeake & Ohio Railroad Co., Richmond, Va.....	Nov. 3, 1916
BARKER, J. R. Pacific Coast Mgr., Neptune Meter Co., 320 Market St., San Francisco, Calif.....	June 15, 1926
W BARRICK, M. J. District Engr., State Dept. of Health, 724 First Ave., Williamsport, Pa.....	Feb. 16, 1924
BARRY, MAJOR DAVID. Engr., National Defence, Canadian Bldg., Ottawa, Ont., Canada.....	Dec. 7, 1933
APW BARTON, HARRY. Supt., Pittsburgh Suburban Water Service Co., 11 Meade Ave., Bellevue, Pa.....	Dec. 20, 1928
W BARTOW, EDWARD. Prof. of Chemistry & Chemical Engineering, State University of Iowa, Iowa City, Iowa.....	June 7, 1906
PW BARTUSKA, JAMES F. Supt., Water Dept., 1629 Cleveland Ave., Whiting, Ind.....	Oct. 14, 1924
AW BASOM, G. E. Supt., Water & Light Commission, Fairmont, Minn.....	June 6, 1927
BASS, FREDERIC. Prof. of Civil Engineering, University of Minnesota, Minneapolis, Minn.....	May 2, 1932
BASSETT, CARROL P., C.E., Summit, N. J.....	Oct. 14, 1909
BASSETT, CHARLES K., M.E. Buffalo Meter Co., 2917 Main St., Buffalo, N. Y.....	June 13, 1921
BASSETT, GEO. B., C.E. 691 W. Ferry St., Buffalo, N. Y.....	Apr. 12, 1909
W BATCHELLER, WILLIS T. Cons. Engr., 1903 Exchange Bldg., Seattle, Wash.....	May 28, 1920
W BATES, RALPH D. State Dept. of Health, State Office Bldg., Albany, N. Y.....	Feb. 10, 1921
W BATON, WARREN U. C. Chief Analyst, 528 S. Lang Ave., Pittsburgh, Pa.....	Apr. 9, 1909
PW BATTSON, S. Chairman, Light & Water Commission, 325 Zebulon St., Barnesville, Ga.....	Jan. 22, 1931
BAUER, L. G. Foreman, Meter Dept., San Francisco Water Dept., 4789 Nineteenth St., San Francisco, Calif.....	Mar. 13, 1931
BAYERD, FORREST G. Water Commissioner, Water Works, City Hall, Dillon, Mont.....	July 1, 1934
BAYLEY, EDGAR A. Engr. of Surveys, Dept. of Water & Power, Box 240, Arcade Annex, Los Angeles, Calif.....	June 1, 1928
GW BAYLIS, JOHN R. Physical Chemist, Bureau of Engineering, 1643 E. 86th St., Chicago, Ill.....	Oct. 2, 1915
APW BEACHAM, J. G. City Engr. & Supt. of Water Works, Athens, Ga.....	Dec. 9, 1930
W BEAL, R. B. Pres., The Flox Co., 1409 Willow St., Minneapolis, Minn.....	June 6, 1927
PW BEAM, R. D. Engr., State School Commission, Raleigh, N. C.	Nov. 7, 1928
W BEAN, ELWOOD L. Chemist, Providence Water Works, 304 Auburn St., Cranston, R. I.....	Apr. 6, 1928
BEAN, GEORGE L. Civil Engr., 1729 N. 19th St., Philadelphia, Pa.....	Dec. 29, 1913

Joined

Joined

13, 1929

APW BEAUBIEN, DeGASPE. Cons. Engr., 660 St. Catherine St.,
West, Room 1104, Montreal, Que., Canada..... July 14, 1930

16, 1919

BECK, FREDERIC E. Mgr., Lexington Water Co., Lexington,
Ky..... Apr. 20, 1915

27, 1922

P BECKER, CHARLES H. Mgr., Hydrant & Valve Dept., R. D.
Wood Co., 400 Chestnut St., Philadelphia, Pa..... Aug. 25, 1927

21, 1906

W BECKETT, R. C. State San. Engr., Dover, Del..... Sept. 27, 1924

13, 1918

6, 1926

P BECKWITH, HOMER E. Dist. Mgr., The Pitometer Co., 2014
Mulberry St., Harrisburg, Pa..... Apr. 8, 1929

3, 1916

PW BEDELL, JAMES. Cornish, N. H..... May 12, 1908

15, 1926

A BEENY, RAYMOND. Sect.-Treas., California Water Service
Co., Federal Reserve Bank Bldg., San Francisco, Calif... Oct. 23, 1931

16, 1924

W BEHRMAN, A. S. Chemical Director, International Filter Co.,
59 E. Van Buren St., Chicago, Ill..... Feb. 28, 1925

7, 1933

APW BEISEL, N. J. Gen. Mgr., Pottsville Water Co., 221 S. Center
St., Pottsville, Pa..... July 31, 1924

20, 1928

P BELANGER, RAPHAEL, C.E. City Engr., Valleyfield, Que.,
Canada..... Jan. 10, 1934

7, 1906

W BELL, ALEXANDER. Pacific Coast Mgr., Wallace & Tiernan
Co., Inc., 171 Second St., San Francisco, Calif..... Nov. 7, 1932

14, 1924

W BELL, H. K. Civil Engr., 372 Transylvania Park, Lexington,
Ky..... Jan. 16, 1924

6, 1927

BELL, HOWARD F. Civil Engr., Cody, Wyo..... Jan. 31, 1930

2, 1932

14, 1909

W BELL, WILLARD J. Engr., Wallace & Tiernan Co., Inc., 614
Flour Exchange Bldg., Minneapolis, Minn..... May 31, 1930

13, 1921

12, 1909

BELYEA, JOHN F. Vice-Pres., Gordon & Belyea Limited,
101 Powell St., Vancouver, B. C., Canada..... Mar. 7, 1934

8, 1929

P BENDER, R. W. Asst. Supt., Water Dept., 2420 Birdsall St.,
Blue Island, Ill..... Apr. 23, 1934

10, 1921

PW BENEDICT, SYDNEY J. Asst. Engr., Bureau of Water, 211 City
Hall, Portland, Ore..... Dec. 3, 1928

9, 1909

BENNETT, J. S. Supt. of Electric & Water Div., University
Consolidated Service Plants, Chapel Hill, N. C..... May 31, 1930

12, 1931

BENNETT, SCHUYLER M. Chief Operator, Reclamation Plant,
Dept. of Water & Power, 3004 Petite Court, Los Angeles,
Calif..... Oct. 6, 1932

3, 1931

BENSON, R. L. Plant Engr., Union Ice Co., 660 S. Alameda
St., Los Angeles, Calif..... Dec. 13, 1932

1, 1934

BENTON, L. J. Supt., Water & Light Dept., Fremont, N. C... Dec. 8, 1923

1, 1928

BERG, ARVID H. Chief Chemist, North American Light &
Power Co., Walnut & Washington Sts., Peoria, Ill.... Mar. 7, 1932

2, 1915

PW BERGSTROM, JOHN. Civil Engr., Gotgatan 96, Stockholm,
Sweden..... Dec. 20, 1928

9, 1930

P BERKEY, FRED L. Supt., Water Dept., Tillamook, Ore..... Mar. 24, 1931

3, 1927

7, 1928

PW BERNHAGEN, LEWIS O. Director of Sanitation, City Hall,
Beaumont, Tex..... Mar. 6, 1917

6, 1928

9, 1913

APW BERRY, ALBERT E. Director, San. Engineering Div., Ontario
Dept. of Health, 235 Gainsborough Rd., Toronto, Ont.,
Canada..... June 21, 1920

APW BERRY, C. RADFORD. 1215 N. Second St., Harrisburg, Pa.... June 16, 1934

APW BERRY, F. R. Engr., American Water Works & Electric Co.,
50 Broad St., New York, N. Y..... Apr. 20, 1923

PW BERTOLINI, HUMBERTO. Chief Engr., Municipal Water
Works, San Jose, Costa Rica, C. A..... Nov. 28, 1932

W BESOZZI, LEO. Asst. City Engr., New City Hall Bldg., 5941
Calumet Ave., Hammond, Ind..... May 7, 1934

PW BESSELEVRE, E. B. San. Engr., The Dorr Co., Inc., 247 Park
Ave., New York, N. Y..... Oct. 7, 1919

	Joined
PW BETTES, CHARLES R. 1197 Beach 9th St., Far Rockaway, N. Y.	June 18, 1901
W BETZ, L. DREW. Chem. Engr., W. H. & L. D. Betz, 235 W. Wyoming Ave., Philadelphia, Pa.	Apr. 2, 1929
W BEYER, A. C. SAN. Engr. & Dist. Mgr., Wallace & Tiernan Sales Corp., 171 Second St., San Francisco, Calif.	May 28, 1934
PW BIBELHAUSEN, LOUIS A. Electrician, Menominee Indian Mills, Neopit, Wis.	Jan. 19, 1933
W BIGGS, GEORGE W., JR. Chief Engr., American Water Works & Electric Co., 50 Broad St., New York, N. Y.	June 2, 1916
PW BINGHAM, CHRISTOPHER F. Asst. Supt. of Filtration, 1502 Nottoway Ave., Richmond, Va.	Sept. 22, 1931
W BINGLEY, W. MCLEAN. Asst. San. Engr., Chlorine Institute, Inc., 3623 Spalding Ave., Baltimore, Md.	Mar. 19, 1934
APW BIRD, BYRON. 1602 Second Ave., North, Fort Dodge, Iowa.	July 31, 1924
BIRD, CYRUS R. The Pitometer Co., 1517 Edison Ave., Detroit, Mich.	Mar. 16, 1922
BIRD, L. C. Pres., Phipps & Bird, Inc., 915 E. Cary St., Richmond, Va.	Dec. 21, 1933
W BIRDSALL, LEWIS I. General Chemical Co., 300 W. Adams St., Box 3, Chicago, Ill.	June 24, 1913
W BIRKENESS, O. T. San. Engr., 605 W. Washington St., Room 511, Chicago, Ill.	May 20, 1930
BIRKINBINE, JOHN L. W. Cons. Engr., 800 Commercial Trust Bldg., Philadelphia, Pa.	Oct. 31, 1930
BISHOP, J. W. Supt., Ithaca Water Dept., City Hall, Ithaca, N. Y.	Apr. 30, 1928
W BLACK, A. P. Prof. of Chemistry, University of Florida, Gainesville, Fla.	Apr. 18, 1929
APW BLACK, ERNEST B. Cons. Engr., Mutual Bldg., Kansas City, Mo.	June 24, 1913
PW BLACK, HAYSE H. Asst. San. Engr., State Dept. of Public Health, 1605 S. Douglas Ave., Springfield, Ill.	Oct. 31, 1933
PW BLACKWELDER, C. D. Chem. & Mech. Engr., J. E. Serrine & Co., Engrs., Greenville, S. C.	May 18, 1926
APW BLAIR, T. J., JR. Div. Mgr., Weston Water Co., Weston, W. Va.	Apr. 23, 1924
BLAKEMAN, S. R. Supt., Water & Light Plant, Dyersburg, Tenn.	Jan. 31, 1927
AP BLANCHARD, R. K., M.E. Vice Pres. & Engr., Neptune Meter Co., 50 W. 50th St., New York, N. Y.	June 19, 1919
BLANCHARD, STANLEY W., Pulp and Paper Mfr., West Linn, Ore.	July 1, 1934
BLISS, HAROLD P. Asst. Civil Engr., Dept. of Water & Power, Box 240, Arcade Annex, Los Angeles, Calif.	Sept. 22, 1931
BLIVEN, JESSE A. Supt., New York Water Service Corp., 9002 91st Ave., Woodhaven, N. Y.	Mar. 12, 1926
APW BLOHM, ARTHUR W. P. Asst. San. Engr., State Dept. of Health, 2206 Walbrook Ave., Baltimore, Md.	Aug. 9, 1922
PW BLOMQUIST, H. F. Supt., City Water Works, Cedar Rapids, Iowa.	May 13, 1917
A BLUM, LOUIS D. Certified Public Accountant, 110 E. 42nd St., New York, N. Y.	June 30, 1929
W BLUMBERG, OSCAR C. Chemist, Chenery Filter Plant, P. O. Box 322, Concord, Calif.	Feb. 18, 1930
APW BLUNDON, J. PAUL. Cons. Engr., Law Bldg., Keyser, W. Va.	Apr. 16, 1930
BOARD, LEONARD M. San. Engr., Hillsdale County Health Dept., Hillsdale, Mich.	June 10, 1930
W BOARDMAN, WILLIAM H. Civil Engr., 426 Walnut St., Philadelphia, Pa.	Apr. 18, 1909
BODKIN, J. T. St. Joseph Water Co., St. Joseph, Mo.	Mar. 19, 1924

		Joined
18, 1901	W BOGERT, CLINTON L. Cons. Engr., 30 Church St., Room 1725, New York, N. Y.	Jan. 19, 1924
2, 1929	A BOGGS, HARRY. Certified Public Accountant, 901 Continental Bank Bldg., Indianapolis, Ind.	Mar. 31, 1930
28, 1934	APW BOHMANN, HENRY P. Supt. of Water Works, Milwaukee, Wis.	May 8, 1913
19, 1933	PW BOLANOS, JUAN J. Civil Engr., P. O. Box 991, San Jose, Costa Rica	Mar. 21, 1934
2, 1916	W BOOKER, WARREN H. Director, Div. of Sanitation, State Board of Health, Raleigh, N. C.	Dec. 11, 1931
22, 1931	P BOOTH, GEORGE W. National Board of Fire Underwriters, 85 John St., New York, N. Y.	Feb. 2, 1924
19, 1934	W BOOTH, L. M. Pres., Booth Chemical Co., P. O. Box 203, Elizabeth, N. J.	May 12, 1914
31, 1924	BORDEN, MORO M. 310 Lees Ave., Collingswood, N. J.	June 5, 1912
16, 1922	PW BOSCH, HERBERT M. Public Health Engr., State Board of Health, Jefferson City, Mo.	Sept. 30, 1929
21, 1933	APW BOTTEN, H. H. Chief Engr., Washington Surveying & Rating Bureau, P. O. Box 1818, Seattle, Wash.	Jan. 16, 1924
24, 1913	P BOUEY, JOHN H. Dist. Supt., Los Angeles Dept. of Water & Power, 14238 Friar St., Van Nuys, Calif.	Oct. 29, 1932
20, 1930	W BOVARD, PAUL F. California Filter Co., 981 Folsom St., San Francisco, Calif.	Aug. 12, 1926
31, 1930	APW BOWEN, CHARLES S. 36, North Parade, Bradford, England.	Feb. 28, 1929
20, 1928	APW BOWMAN, ABRAHAM M. Supt. of Pub. Utilities, Elmira, Ont., Canada	Oct. 21, 1919
8, 1929	W BOYCE, EARNEST. Chief Engr. & Director, Div. of Water & Sewage, State Board of Health, Lawrence, Kans.	Apr. 13, 1926
4, 1913	PW BOYD, GEORGE E. New York Dist. Mgr., Wailes Dove-Hermiston Corp., 17 Battery Place, New York, N. Y.	May 9, 1931
1, 1933	W BOYNTON, PERKINS. Chemist in Charge of Filter Plant, Clarksburg Water Board, 624 Locust Ave., Clarksburg, W. Va.	June 16, 1920
8, 1926	W BRADBURY, EDWARD G. County San. Engr., Court House, Columbus, O.	June 16, 1919
3, 1924	PW BRADLEY, J. F. Chief Engr. & Bacteriologist, R. F. D. 8, Valparaiso, Ind.	Feb. 10, 1921
1, 1927	BRADY, M. J. San. Chemist, Dept. of Water & Power, 4632 Russel Ave., Los Angeles, Calif.	Mar. 14, 1933
9, 1919	APW BRAGG, GEORGE H. Engr. of Maintenance, 245 Market St., San Francisco, Calif.	Oct. 14, 1922
1, 1934	BRAIDCH, MATHEW M. Senior Chemist, Baldwin Filtration Plant, Baldwin & Fairmount Roads, Cleveland, O.	May 31, 1930
2, 1931	BRACKENRIDGE, C. City Engr., City Hall, Vancouver, B. C., Canada	Nov. 8, 1923
2, 1926	W BRANDIS, FRED E. Supt., Munic. Water Works, Blaine Co., Chinook, Mont.	Mar. 13, 1925
9, 1922	PW BRANTLY, E. C. Mgr., Water, Gas & Electric Depts., Danville, Va.	Feb. 21, 1927
3, 1917	AP BRAYTON, JOHN C. Asst. Treas., Consolidated Water Co., 712 Washington St., Utica, N. Y.	Mar. 31, 1933
1, 1929	P BREDEHOFT, HENRY E. Engr. in charge, Plant Operation, Dept. of Water & Power, 410 Ducommun St., Los Angeles, Calif.	Oct. 28, 1933
1, 1930	P BREITKREUTZ, E. W. Asst. Engr., Pipe Construction, Dept. of Water & Power, 410 Ducommun St., Los Angeles, Calif.	Oct. 31, 1929
1, 1930	P BRENNAN, WILLIAM M. Agent, Commonwealth Public Service Co. of Montana, Deer Lodge, Mont.	Apr. 16, 1934
1, 1909	BRETZ, C. E. 1221 N. Penna Ave., Oklahoma City, Okla.	Aug. 1, 1923

	Joined
W BRICKENDEN, F. M. Dist. Engr., Dept. of Pensions & National Health, 228 Home St., Winnipeg, Man., Canada.	June 29, 1928
BRIDGERS, J. H. Mgr., Henderson Water Works, Municipal Bldg., 108 W. Young St., Henderson, N. C.	June 5, 1922
P BRIDGES, CARL Supt., Water Dept., Crothersville, Ind.	July 1, 1934
AP BRIGGS, HENRY M. Asst. Sect., Hollister Water Co., Hollister, Calif.	Oct. 31, 1933
APW BRISTOL, THEODORE L. Pres. & Mgr., Ansonia Water Co., 354 Main St., Ansonia, Conn.	June 6, 1934
APW BROOK, HARRY L. Supt., Osgood Water Co., 313 N. Maple St., Osgood, Ind.	Apr. 25, 1932
BROOKS, THOMAS Supt., Domestic Distribution, Dept. of Water & Power, 2045 N. Catalina St., Los Angeles, Calif.	Sept. 10, 1925
PW BROSSMAN, CHARLES Cons. Engr., 1010 Chamber of Commerce Bldg., Indianapolis, Ind.	Apr. 7, 1916
BROWN, C. ARTHUR San. Engr., West Erie Ave., R. F. D. 2, Lorain, O.	June 27, 1905
BROWN, C. D. Sect.-Treas., Walkerville-East Windsor Water Commission, Walkerville, Ont., Canada	Oct. 16, 1916
APW BROWN, C.E. Mgr., Public Utilities Commission, Meaford, Ont., Canada	Mar. 7, 1932
P BROWN, CLAUDE R. Mgr., American Cast Iron Pipe Co., 1203-4 Detwiler Bldg., Los Angeles, Calif.	Aug. 22, 1931
BROWN, EDWARD Supt. of Water Works, Eau Claire, Wis.	Jan. 24, 1921
PW BROWN, HERBERT H. Civil Engr., c/o City Engr., City Hall, Milwaukee, Wis.	Nov. 19, 1929
W BROWN, HORACE A, C.E. Cons. Engr. & Supt. of Water Works, Ottumwa, Iowa	May 7, 1919
BROWN, J. O. Mgr., Pump & Engineering Dept., Crane-O'Fallon Co., 1631 Fifteenth St., Denver, Colo.	Jan. 28, 1930
PW BROWN, JAMES R. Solicitor of Contracts, P. O. Box 1091, Columbus, O.	July 21, 1934
W BROWN, KENNETH W. San. Engr., California Water Service Co., Stockton, Calif.	July 11, 1927
BROWN, ROBERT F. Plant Mgr., California Water Service Co., Stockton, Calif.	Aug. 30, 1930
BROWN, W. M. City Mgr., Tulare, Calif.	Mar. 23, 1932
APW BROWN, WALTER M. Office Engr., Water Dept., 308 Public Utilities Bldg., Long Beach, Calif.	May 28, 1934
W BROWNELL, O. E. San. Engr., State Dept. of Health, Div. of Sanitation, University Campus, Minneapolis, Minn.	Apr. 28, 1932
P BROWNING, C. R. Chief Engr., San Joaquin Rancho, Tustin, Calif.	Nov. 7, 1932
AP BROZ, FRANK J. Supt., Bureau of Water, 5145 Cermak Road, Cicero, Ill.	Aug. 31, 1933
APW BRUEGGEMAN, A. R. Director of Public Utilities, 105 City Hall, Cleveland, O.	Sept. 13, 1932
P BRUHN, JOHN A. Sales Promotion, Indianapolis Water Co., 113 Monument Circle, Indianapolis, Ind.	Apr. 16, 1930
W BRUMBAUGH, W. V. Sect., National Lime Association, 927 15th St., N. W., Washington, D. C.	Mar. 16, 1929
BRUNE, FRED H. Pacific Coast Sales Mgr., Rensselaer Valve Co., 411 Sharon Bldg., San Francisco, Calif.	Sept. 8, 1931
BRUNNER, JOHN F. Vice Pres. & Gen. Mgr., Middletown & Royalton Water Co., 308 Commonwealth Trust Bldg., Harrisburg, Pa.	Aug. 24, 1933
APW BRUSH, FREDERICK C. Mgr., Bound Brook Water Co., 519 Watchung Road, Bound Brook, N. J.	Jan. 7, 1924

		Joined
	DAPW BRUSH, WILLIAM W. Editor, "Water Works Engineering," 24 W. 40th St., New York, N. Y.	Feb. 18, 1911
	BRYANT, G. A. Chief Engr., Cannon Mills, Kannapolis, N. C.	Aug. 18, 1933
	PW BUCCOWICH, PAUL, JR. Supt., Light & Water Dept., Ely, Minn.	May 17, 1933
	BUCHANAN, ALBERT M. Engr., Gartshore-Thomson Pipe & Foundry Co., Ltd., Hamilton, Ont., Canada.	June 17, 1926
	BUCHANAN, EDWARD V. Gen. Mgr., Public Utilities Com- mission, London, Ont., Canada.	Apr. 29, 1926
	BUCHANAN, HUGH. Compania Consolidada de Aguas, Cor- rientes Del Rosario Ltda., Rosario De Sante Fe, Ar- gentine.	June 25, 1924
	PW BUCK, F. W. Dist. Operating Mgr., Delaware Valley Utilities Co., Scottdale, Pa.	Apr. 30, 1930
	W BUCK, GEORGE H. Asst. Engr., with Nicholas S. Hill, Jr., Cons. Engr., 55 Cherry St., Elizabeth, N. J.	Jan. 28, 1926
	APW BUELL, WM. C. Gen. Mgr., Millville Water Co., High St., Millville, N. J.	June 17, 1926
	BUGHER, S. B. Supt., Water Works, Reidsville, N. C.	Jan. 11, 1930
	W BULL, IRVING C. Analytical & Cons. Chemist, 50 West St., New York, N. Y.	June 8, 1906
	W BULLARD, J. L. Supt., Water, Light & Power Dept., Drawer 598, Lexington, N. C.	Aug. 26, 1925
	APW BULLOCK, DEWITT H. Supt. of Water System, 80 Walnut St., Canajoharie, N. Y.	Jan. 1, 1928
	BUNCH, THOS. C. City Marshall, Pomeroy, Wash.	July 6, 1934
	W BUNKER, GEORGE C. Cons. Engr., P. O. Box 5035, Ancon, C. Z.	Feb. 23, 1911
	PW BUNNELL, KENNETH J. Asst. Chemist., Metropolitan Utili- ties District, 5335 N. 25th Ave., Omaha, Neb.	June 25, 1934
	W BURCHARD, EDWIN D. Dist. Engr., U. S. Geological Survey, 220 Post Office Bldg., Asheville, N. C.	Jan. 5, 1925
	W BURDICK, CHARLES B. Hyd. & San. Engr., 1401 Civic Opera Bldg., Chicago, Ill.	July 18, 1907
	APW BURGESS, PHILIP. Cons. Engr., 568 E. Broad St., Colum- bus, O.	Apr. 27, 1911
	W BURNETT, DOUGLAS H. San. Engr., Standard Oil Co. of Calif., 3847-21st. St., San Francisco, Calif.	Jan. 27, 1932
	AP BURNIE, ARTHUR N. Vice Pres. & Treas., Beaver Valley Water Co., 1006-7th Ave., Beaver Falls, Pa.	Mar. 22, 1916
	BURT, AUSTIN. Supt., Water Dept., Ontario, Calif.	July 12, 1929
	BURT, JOHN. Gen. Mgr., Marin Munic. Water Works, 468-4th St., San Rafael, Calif.	May 20, 1920
	W BUSWELL, A. M. Chief, State Water Survey Div., Urbana, Ill.	Mar. 20, 1916
	BUTLER, H. N. Carolina Drilling & Equipment Co., San- ford, N. C.	Oct. 31, 1930
	BUTLER, ORVILLE C. Supt., Dept. of Public Service, Niagara Falls, N. Y.	Mar. 23, 1932
	W CADMAN, ROBERT M. 244 Cambridge Ave., Red Bank, N. J.	May 28, 1924
	CADY, H. R. Mech. Engr., Hackensack Water Co., 624 Park Ave., Weehawken, N. J.	June 22, 1929
	P CAHILL, RALPH H. Cons. Engr., 214 Mason St., Milwaukee, Wis.	May 10, 1930
	PW CAIRD, JAMES M. Chemist & Bacteriologist, Cannon Bldg., Broadway & Second St., Troy, N. Y.	May 16, 1900
	PW CALDWELL, K. W. Supt., Munic. Water Dept., 412 E. Aztec St., Gallup, N. M.	June 12, 1934

	Joined
CALLAGHAN, ROBERT R. Engr. & Contractor, Columbia Hotel, Highland, Ill.	Mar. 2, 1934
CALLAHAN, T. G. City Mgr., P. O. Box 202, Clayton, N. M.	Nov. 6, 1933
PW CALVERT, CECIL K. Chemist, Indianapolis Sewage Commission, R. R. 3, Box 976 H, Indianapolis, Ind.	Nov. 22, 1920
CAMERON, ARCHIBALD P. Worthington-Simpson, Ltd., Queens House, Kingsway, London, W. C. 2, England	June 4, 1912
APW CAMP, THOS. R. Assoc. Prof. of San. Engineering, Massachusetts Institute of Technology, Cambridge, A, Mass.	Jan. 17, 1930
W CAMPBELL, ELMER W. State Dept. of Health, Augusta, Me.	Dec. 8, 1923
CAMPBELL, H. A. Supt. of Public Activities, Cornwall, Ont., Canada	Apr. 6, 1933
W CAMPBELL, JOHN T. Cons. Engr., 813 Clark Bldg., Pittsburgh, Pa.	Oct. 14, 1931
CAMPBELL, JOHN W. Supt., Water Works, Ridgetown, Ont., Canada	Dec. 19, 1933
CAMY, L. L. Local Mgr., California Water Service Co., Chico, Calif.	May 8, 1930
PW CANNON, J. W. Supt., Water Works, Marietta, Ga.	Mar. 22, 1928
W CAPEN, CHARLES H., JR. Senior Asst. Engr., North Jersey District Water Supply Commission, 8 Florence Place, West Orange, N. J.	Apr. 16, 1930
P CAPRON, JOHN D. Pres., Glamorgan Pipe & Foundry Co., Lynchburg, Va.	Jan. 30, 1924
CAREY, JAMES B. City Engr. & Supt. of Water Works, City Hall, Decatur, Ga.	July 24, 1934
CAREY, THOS. M. Engr. of Service & Maintenance, Water Dept., 105 City Hall, Cleveland, O.	Sept. 13, 1932
PW CAREY, W. GORDON. Water Analyst & Consultant, 29 John St., Sunderland, Co. Durham, England	Mar. 31, 1931
W CARLIN, PHIL. Supt., Water Works, Sioux City, Iowa	Apr. 14, 1931
PW CARPENTER, J. D. Civil Engr., P. O. Box 366, Harrisburg, Pa.	May 20, 1930
W CARPENTER, LEWIS V. Prof. of San. Engineering, West Virginia University, Box 562, Morgantown, W. Va.	June 28, 1926
APW CARR, J. A. Supt., Village Water Dept., Ridgewood, N. J.	May 3, 1916
CARROLL, EUGENE. Vice Pres. & Mgr., Butte Water Co., Butte, Mont.	June 7, 1904
PW CARROLL, HUGH J. Engr. of Water Extension, City Hall, Yonkers, N. Y.	Apr. 30, 1931
AP CARTER, EARL L. Cons. Engr., 814 Continental Bank Bldg., Indianapolis, Ind.	Dec. 9, 1932
CASAD, CHARLES C. City Engr. & Supt., Water Dept., City Hall, Bremerton, Wash.	Jan. 25, 1926
CASAD, ORLA. Supt. of Water Works, Box 624, Merced, Calif.	Nov. 6, 1924
PW CASE, EGBERT D. Vice Pres., The Pitometer Co., 50 Church St., New York, N. Y.	Mar. 4, 1921
PW CASE, H. R. Mgr., Corona City Water Co., 707 Main St., Corona, Calif.	May 28, 1926
CASHIN, WILLIAM D. Supt., Water Works Dept., 317 Broadway, Kingston, N. Y.	May 23, 1933
CATES, R. H. Power Engr., Southern-California-Edison Co., P. O. Box 135, Los Angeles, Calif.	June 16, 1920
CATES, W. D. Asst. to Chief Engr., Southeastern Underwriters Assn., Box 1743, Atlanta, Ga.	June 25, 1930
PW CATES, WALTER H. Salesman, Western Pipe & Steel Co., 5717 Santa Fe Ave., Los Angeles, Calif.	Sept. 22, 1931
APW CAUGHEY, J. E., B. Sc. Supt., Water Works Dept., Wallaceburg, Ont., Canada	Mar. 28, 1928
CHALFANT, JOHN C. Supt., Water Works, City Hall, Fort Lauderdale, Fla.	Mar. 26, 1931

		Joined
	W CHAMBERLAIN, L. H. Mgr., Water Works Supply Co., 504 Subway Terminal Bldg., Los Angeles, Calif.....	Jan. 2, 1924
2, 1934 6, 1933	AP CHAMBERS, JOHN. Chief Engr. & Supt., Louisville Water Co., Louisville, Ky.....	June 8, 1921
22, 1920	W CHAMOT, E. M. Prof. of San. Chemistry, Cornell University, Ithaca, N. Y.....	Feb. 13, 1915
4, 1912	W CHAMPE, GEORGE. Cons. Engr., 1025 Nicholas Bldg., Toledo, O.....	Mar. 10, 1913
17, 1930 8, 1923	AP CHAPIN, CARL K. Commercial Director, Box 240, Arcade Annex, Los Angeles, Calif.....	Oct. 19, 1929
6, 1933	PW CHAPMAN, F. W. Greenwood, S. C.....	Dec. 5, 1925
4, 1931	PW CHAPMAN, WILLIAM J. Supt., New York Water Service Corp., 29 Broad St., Haverstraw, N. Y.....	Mar. 22, 1927
9, 1933	APW CHARLES, E. D. Supt. of Public Works, Julesburg, Colo.....	Nov. 6, 1933
8, 1930 2, 1928	W CHASE, EDWARD S. Cons. Engr. Metcalf & Eddy, Cons. Engrs., 1300 Statler Bldg., Boston, Mass.....	May 3, 1919
6, 1930	AP CHASE, GEORGE E. Mgr., Bowmanville Public Utilities, Bowmanville, Ont., Canada.....	Sept. 12, 1933
0, 1924	CHASE, HORACE H. Box 252, Sandwich, Mass.....	May 28, 1924
4, 1934	CHASE, RICHARD D., C.E. 607 Purchase St., New Bedford, Mass.....	Nov. 3, 1919
3, 1932	CHENERY, CHRISTOPHER T. Pres., Federal Water Service Corp., 27 William St., New York, N. Y.....	June 17, 1926
1, 1931 4, 1891 1, 1930	W CHESTER, J. N., H. & M.E. Clark Bldg., Suite 813, Pitts- burgh, Pa.....	Nov. 7, 1910
3, 1932	G CHEVALIER, WILLARD. Vice Pres. in Charge of Civil Engineer- ing Publications, McGraw-Hill Publishing Co., 330 W. 42nd St., New York, N. Y.....	June 4, 1934
1, 1931 4, 1891 1, 1930	CHIDAINE, PAUL. Administrateur-Directeur, Eau et Assain- issement, 93, Rue Du Rocher, Paris, 8, France.....	May 26, 1930
3, 1926 1, 1916	PW CHILDS, FRED S. Cons. Engr., 132 Nassau St., New York, N. Y.....	May 26, 1930
1, 1904	APW CHINN, KEITH R. Chemist, Bacteriologist & Chief Engr., West Palm Beach Water Co., Box 1313, West Palm Beach, Fla.....	Feb. 23, 1927
1, 1931	CHRISTENSEN, C. H. Mgr., Missoula Div., Montana Power Co., Missoula, Mont.....	Oct. 4, 1919
1, 1932	CHRISTY, J. F. Gen. Mgr., City Water & Light Plant, 411 Union St., Jonesboro, Ark.....	Jan. 12, 1925
1, 1926 1, 1924	CHUBB, ROBERT S. Borough Engr., Hamburg, Pa.....	May 26, 1930
1, 1921	APW CHUTE, W. M. Waterworks Supt., Wheatley, Ont., Canada..	Apr. 25, 1934
1, 1926 1, 1924	CLAFLIN, CHARLES R. Supt., Water Co., Rensselaer, N. Y...	Sept. 30, 1919
1, 1921	W CLARK, A. E. 1106 Frederica St., Owensboro, Ky.....	June 10, 1919
1, 1926	CLARK, ARTHUR T. National Water Main Cleaning Co., 222 Dean St., Woodstock, Ill.....	May 16, 1919
1, 1933	APW CLARK, F. W. G. Water Works Engr., British Municipal Council, Tientsin, N. China.....	June 22, 1923
1, 1920	W CLARK, HARRY W. Chief Chemist, State Dept. of Health, State House, Room 541, Boston, Mass.....	May 26, 1920
1, 1930	PW CLARK, HORACE L. Supt., Sanford Water Dist., Sanford, Me.	Apr. 16, 1930
1, 1931	W CLARK, WILLIAM H. Supt., Water Works, Avon, N. Y.....	May 31, 1916
1, 1928	PW CLASSON, W. GUY. Supt. & Registrar, Leominster Water Works, Leominster, Mass.....	June 30, 1931
1, 1931	AP CLAUS, A. E. Supt. of Water Works, Beamsville, Ont., Canada.....	Jan. 1, 1934
1, 1928	CLAY, JOE. Supt., Water Works, Carlisle, Ky.....	Jan. 7, 1924
1, 1931	W CLAYTON, NELSON J. Supt., Pottsville Water Co., 221 Centre St., Pottsville, Pa.....	Mar. 27, 1925
	AP CLEVELAND, E. A. Chief Commissioner, Greater Vancouver Water Dist., 1303 Bekins Bldg., Vancouver, B. C., Canada.....	Mar. 12, 1924

	Joined
PW CLEVERDON, WALTER S. L. Supervisor of Property & Assoc. Prof. of San. Engineering, New York University, Washington Square, New York, N. Y.....	Apr. 3, 1916
CLIFFORD, U. A. Supt., Light & Water Dept., Cairo, Ga.....	Apr. 22, 1929
W CLIFTON, CHARLES E. Chemist, Cannon Bldg., Troy, N. Y.....	Mar. 12, 1910
COBLEIGH, W. M. Dean, School of Engineering, State A. & M. College, Bozeman, Mont.....	May 5, 1933
AP COBURN, JAMES W. Treas., Rensselaer Water Co., P. O. Box 868, Portland, Me.....	Feb. 19, 1923
COCHRAN, J. D. Supt., Water Works, Statesville, N. C.....	Dec. 8, 1923
A CODY, J. P. Asst. Treas., Ohio Water Service Co., 235 State St., Struthers, O.....	Jan. 27, 1933
COE, GLEN F. Mgr., Sect. & Treas., Dixon Water Co., 121 E. First St., Dixon, Ill.....	May 31, 1930
W COGSWELL, W. F. State Health Officer, Helena, Mont.....	May 5, 1933
COLE, EDWARD S. Pres., The Pitometer Co., 50 Church St., New York, N. Y.....	June 12, 1902
COLEMAN, DWIGHT B. 28 Madison St., Cortland, N. Y.....	May 25, 1929
PW COLLIER, F. E. Supt., Munic. Water Works, 253 Broad St., Cookeville, Tenn.....	Apr. 13, 1926
W COLLINS, W. D. Chemist, U. S. Geological Survey, Washington, D. C.....	Dec. 18, 1925
COLWELL, E. J. Water Supt., Ritzville, Wash.....	June 25, 1934
PW CONARD, WILLIAM R. Cons. Engr., 321 High St., Burlington, N. J.....	June 7, 1904
CONK, ROBERT H. Chemist & Bacteriologist, West Palm Beach Water Co., 529-34th St., West Palm Beach, Fla....	Apr. 30, 1931
APW CONLAN, JAMES F. Asst. Engr., Water Dept., Village of Scarsdale, 153 S. Lexington Ave., White Plains, N. Y....	Apr. 16, 1934
W CONNELL, WILLIAM B. Pres., Chemical Engineering Laboratories, 2403-05 S. Ervay St., Dallas, Tex.....	Aug. 11, 1930
W CONNOLLY, JOEL I. Chief, Bureau of Public Health Engineering, Board of Health, Chicago, Ill.....	June 10, 1930
CONNOR, F. J. 221 N. Spring Ave., Sioux Falls, S. D.....	May 16, 1900
W CONTINENTINO, LINCOLN DE C. Chief San. Engr., Bello Horizonte, State of Minas, 414 Avenida Alvares Cabral, Geraes, Brazil.....	June 24, 1929
APW COOK, ARTHUR T. Gen. Supt. & Engr., Passaic Consolidated Water Co., 156 Ellison St., Paterson, N. J.....	Dec. 21, 1928
COOK, BERT. Water Plant Operator, Cornelia, Ga.....	May 7, 1934
COOK, JOHN H. Pres., Passaic Consolidated Water Co., 158 Ellison St., Paterson, N. J.....	July 10, 1906
APW COOK, PAUL D. Lake County San. Engr., Court House, Painesville, O.....	Mar. 13, 1934
PW COOK, WM. J. M. Chief Chemist, Neckar Water Softener Co., Ltd., 96, Victoria St., London, S. W. 1, England.....	June 11, 1934
COOKE, ALLAN G. Public Works Dept., Singapore, Straits Settlements.....	Mar. 24, 1931
AP COOPER, M. B. Asst. City Engr., Augusta, Ga.....	May 23, 1933
P COPELAND, ROSS A. Supt., Pipe Construction, Dept. of Water & Power, 6676 Franklin Ave., Los Angeles, Calif.....	Oct. 31, 1930
CORBETT, L. M. Supt. of Water Works, Baker, Mont.....	Apr. 28, 1930
PW CORIN, MAGNUS F. Chemist, 511 Hansberry St., Germantown, Philadelphia, Pa.....	Apr. 20, 1910
PW CORINE, GEORGE A. Supt., Water & Gas Dept., Superior Water, Light & Power Co., Superior, Wis.....	Oct. 31, 1924
CORNELL, CHAS. B. Construction Engr., Box 63, Cockeysville, Md.....	May 31, 1928
W CORTESE, J. R. Supt., Water Works, 411 S. Second St., Livingston, Mont.....	Mar. 13, 1925

		Joined
	COSCULLUELA, JUAN A. Cons. Engr., Calle Linea Numero 72, Altos, Havana, Cuba.....	Oct. 16, 1913
1916	W COUGHLAN, ROBERT E. Supervisor of Water Supply, C. & N. W. Ry. Co., 400 W. Madison St., Chicago, Ill.....	Feb. 28, 1923
1929	APW COULTER, WALDO S. Cons. Engr., 120 Liberty St., New York, N. Y.....	Nov. 17, 1916
1910	APW COWLES, M. WARREN. Hackensack Water Co., Filtration Plant, New Milford, N. J.....	Apr. 7, 1919
1933	PW COX, CHARLES R. Assoc. Engr., State Dept. of Health, Albany, N. Y.....	July 30, 1921
1923	PW CRAIG, EARL C. 87 Comstock Ave., Providence, R. I.....	Apr. 16, 1930
1923	PW CRAIG, GEORGE L. Pres., Brownsville Water Co., 808 Columbia Bldg., Pittsburgh, Pa.....	Nov. 21, 1933
1933	W CRAIG, JAMES J. City Engr. & Water Works Supt., City Bldg., Zion, Ill.....	Apr. 6, 1928
1930	CRAMER, CLARK J. Mech. Engr., Lexington Water Co., Lexington, Ky.....	July 29, 1930
1933	APW CRANCE, EUGENE T. Mgr., New Rochelle Water Co., 304 Eastchester Road, New Rochelle, N. Y.....	Mar. 19, 1922
1926	W CRANE, ARTHUR M. Gary, Ind.....	May 26, 1918
1925	CRICHTON, ALEX. F. Water Commissioner, Eighth & Market Sts., Wilmington, Del.....	Feb. 3, 1932
1934	APW CRIST, MARION L. Burns & McDonnell Engineering Co., 107 W. Linwood Blvd., Kansas City, Mo.....	Feb. 24, 1933
1904	PW CRITCHLOW, H. T. Div. Engr., New Jersey State Water Policy Commission, Trenton Trust Company Bldg., Trenton, N. J.....	Feb. 15, 1930
1931	W CROFOOT, E. H. Supt., City Water Works, Mason City, Iowa.....	Oct. 5, 1923
1934	CROLL, EMIL A. Retired, 639 Putnam St., Orlando, Fla.....	Sept. 7, 1893
1930	P CRONISTER, J. R. Mgr., Dorchester Water Co., Cambridge, Md.....	June 5, 1934
1930	AP CROWLEY, CORNELIUS M. Water Registrar, St. Paul, Minn.....	Oct. 18, 1918
1900	CROZIER, RAY. Engr. & Supt., Peoria Water Works, Peoria, Ill.....	Feb. 5, 1915
1929	W CRUGER, C. B. Salesman, Darling Valve & Mfg. Co., 1209 N. Oxford St., Indianapolis, Ind.....	Nov. 15, 1924
1928	W CUDDEBACK, ALLAN W. Federal Water Service Corp., 27 William St., New York, N. Y.....	June 7, 1904
1934	APW CULLEN, BERNARD W. Supt., Water Pipe Extension, 404 City Hall, Chicago, Ill.....	May 18, 1934
1906	CULTER, L. W. Supervising Refrig. Engr., Florida Power & Light, Miami, Fla.....	Apr. 25, 1934
1934	CUNLIFFE, RUSSELL W. Health Dept., City Hall, Milwaukee, Wis.....	Dec. 13, 1926
1934	W CUNNINGHAM, F. G. Fuller & McClintock, Cons. Engrs., 11 Park Place, New York, N. Y.....	Apr. 30, 1923
1931	CUNNINGHAM, JOHN W. Cons. Engr., 414 Spalding Bldg., Portland, Ore.....	May 28, 1929
1933	P CUNNINGHAM, M. B. Asst. Supt., Water Dept., Oklahoma City, Okla.....	Oct. 31, 1930
1930	PW CURRY, TRUMAN M., JR. Assoc. Engr., With Nicholas S. Hill, Jr., Cons. Engr., 112 E. 19th St., New York, N. Y.....	Feb. 15, 1930
1910	W CURTIS, FRANCIS J. Merrimac Chemical Co., Everett Station, Boston, Mass.....	Apr. 20, 1928
1924	PW CURTIS, J. EUGENE. Senior Engr., Dalecarlia Filter Plant, Washington, D. C.....	May 3, 1923
1928	CUTHIELL, C. Supt. of Water Works, Dickson St., Galt, Ont., Canada.....	Apr. 17, 1929
1925	CUTTS, FRANCIS T. Pres. & Treas., Missouri Engineering & Contracting Co., 5841 Hamilton Ave., St. Louis, Mo.....	June 15, 1914

	Joined
W CYR, RENE. San. Engr., Provincial Bureau of Health, 89 Notre Dame St., E., Montreal, Que., Canada.....	Jan. 10, 1934
DAFOE, A. L. Supt., Water Works Dept., Napanee Public Utility Commission, Napanee, Ont., Canada.....	Feb. 25, 1932
APW DAILY, C. M. Water Commissioner, 312 City Hall, St. Louis, Mo.....	Sept. 28, 1933
DANGLER, J. R. Cast Iron Pressure Pipe Institute, Earle Bldg., Room 1006, Washington, D. C.....	Apr. 22, 1931
W DANIELS, FRANCIS E. State Dept. of Health, Engineering Div., 2115 N. Second St., Harrisburg, Pa.....	Sept. 2, 1916
PW DANIELS, PAUL I. Land Agent, East Bay Municipal Utility Dist., 512—16th St., Oakland, Calif.....	May 23, 1933
W DAPPERT, JAMES W., C.E. Lock Box 141, Taylorville, Ill.....	Oct. 23, 1914
P DARK, WATSON A. Vice Pres., West Virginia Water Service Co., 814 Peoples Bank Bldg., Charleston, W. Va.....	May 4, 1929
W DARLING, ERNEST H., M.E. Cons. Engr., 21 Stanley Ave., Hamilton, Ont., Canada.....	Dec. 29, 1925
APW DAUGHERTY, FRANK. Pres., Scofield Engineering Co., 1324 Commercial Trust Bldg., Philadelphia, Pa.....	Mar. 13, 1931
DAVIDSON, GEORGE M. Ind. Engr., C. & N. W. Ry. Co., 211 N. East Ave., Oak Park, Ill.....	Mar. 11, 1915
PW DAVIDSON, GEORGE T. Supt., Water Works & Sewers, Mooresville, N. C.....	Jan. 11, 1930
DAVIES, W. F. Supt., Gloversville Water Works, 19 W. Fulton St., Gloversville, N. Y.....	Feb. 23, 1932
DAVIS, CARLETON E. Mgr., Philadelphia Suburban Water Co., 762 Lancaster Ave., Bryn Mawr, Pa.....	Apr. 28, 1912
W DAVIS, DANIEL E. Cons. Engr., The J. N. Chester Engineers, 813 Clark Bldg., Pittsburgh, Pa.....	May 26, 1930
PW DAVIS, FRANK J. Supt., Ansonia Water Co., 354 Main St., Ansonia, Conn.....	May 15, 1916
DAVIS, FRANK J. Technician, Summers Clinical Laboratory, 5252 Hohman Ave., Hammond, Ind.....	Mar. 26, 1934
APW DAVIS, H. F. Dist. Mgr., Wallace & Tiernan Co., Inc., 1720 Beverly Drive, Charlotte, N. C.....	Dec. 8, 1923
P DAVIS, S. H. Supt., Benwood & McMechen Water Co., 4820 Water St., Benwood, W. Va.....	Mar. 22, 1934
PW DAVIS, WALTER S. 686 Myrtle Ave., Albany, N. Y.....	May 5, 1933
DAW, LAWRENCE. Mgr., New York Fire Insurance Rating Organization, 400 E. Genesee St., Syracuse, N. Y.....	May 9, 1916
W DAWES, E. A. Dawes Silica Mining Co., Thomasville, Ga.....	Feb. 2, 1933
W DAWSON, F. M. Prof. of Hydraulics, University of Wisconsin, Madison, Wis.....	Oct. 17, 1928
W DEAN, JOHN B. Asst. Div. Engr., Water Div., 1640 S. Kingshighway, St. Louis, Mo.....	Apr. 30, 1930
APW DEBERARD, W. W. "Engineering News-Record," 520 N. Michigan Ave., Chicago, Ill.....	June 3, 1912
APW DE BRITO, F. SATURNINO R., FILHO, San. Engr., Caixa 1631, Rio de Janeiro, Brazil.....	May 31, 1930
W DECKER, A. CLINTON. San. Engr., Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.....	June 2, 1914
W DECKER, ARTHUR J. Cons. Civil Engr., 2014 Geddes Ave., Ann Arbor, Mich.....	May 23, 1923
P DECKER, FREDERICK F., C.E. Asst. Engr. in Charge of Construction Div., Dept. of Water Supply, 128 Taylor St., West New Brighton, N. Y.....	Dec. 19, 1930
W DE COSTA, JOSEPH D. San. Engr., East Bay Municipal Utility District, 512—16th St., Oakland, Calif.....	Sept. 17, 1923
APW DE GROOT, J. C. Supt., Clear Springs Water Service Co., 2019 Main St., Northampton, Pa.....	Jan. 22, 1931

	Joined
PW DE JARNETTE, L. W. Chemist, Atlanta Water Works, 866 Briarcliff Rd., N. E., Atlanta, Ga.....	Mar. 26, 1934
DE JARNETTE, N. M. Chemist, State Board of Health Laboratory, Atlanta, Ga.....	Mar. 11, 1930
DELANEY, J. T. Mgr., Oregon-Washington Water Service Co., 304 S. Commercial St., Salem, Ore.....	Oct. 14, 1924
W DE MARTINI, FRANK E. San. Engr., 637 Greenwich St., San Francisco, Calif.....	Sept. 13, 1927
AP DE MOYA, P. PAUL. Mgr., Consumer's Water Co., Stuart, Fla.	Dec. 22, 1926
W DENNETT, ROBERT C. Hyd. Engr., National Board of Fire Underwriters, 85 John St., New York, N. Y.....	May 15, 1914
DENTON, FRANK. Supt. of Water Works, Salem, Ill.....	Aug. 18, 1933
W DERBY, RAY L. Asst. San. Engr., Dept. of Water & Power, 207 South Broadway, Los Angeles, Calif.....	May 29, 1926
DES BAILLETS, C. J. Chief Engr., Montreal Water Board, 3161 Joseph St., Verdun, Que., Canada.....	Mar. 26, 1934
DESLAURIERS, ALFRED J., C.E. Lachine Water Works, 580 St. Joseph St., Lachine, Que., Canada.....	Dec. 26, 1933
P DETWEILER, JOHN C. Construction Engr., Metropolitan Utilities District, Omaha, Neb.....	Mar. 27, 1930
PW DEVENDORF, EARL. Assoc. Dir., Div. of Sanitation, State Dept. of Health, 1228 State St., Schenectady, N. Y....	May 22, 1919
DEVILBISS, H. ROLAND. Dept. Engr., Washington Suburban San. District, Hyattsville, Md.....	Apr. 10, 1922
AP DEWEY, HUGH S. Mgr., Western New York Water Co., 11 Niagara St., Buffalo, N. Y.....	May 27, 1929
DICKEY, F. F. A. O. Smith Co., 548 Roosevelt Bldg., Los Angeles, Calif.....	Sept. 22, 1931
DICKSON, C. B. Commissioner of Public Utilities, Dept. of Water & Sewerage, City Hall, Shreveport, La.....	May 3, 1932
DI DOMENICO, ANTHONY F. Bureau of Water Supply, Municipal Office Bldg., Baltimore, Md.....	Mar. 9, 1927
PW DIGNAN, B. T. Chemist & Bacteriologist, City Water Works, Niagara Falls, N. Y.....	Apr. 10, 1919
PW DILL, H. A. Supt., Water Works, Richmond, Ind.....	May 16, 1900
A DILLON, RICHARD. Clerk, Water Bureau, Metropolitan District Commission, Municipal Bldg., Hartford, Conn....	Aug. 13, 1929
W DILLON, S. E. Local Mgr., California Water Service Co., Box 1148, Bakersfield, Calif.....	May 31, 1927
A DIMICK, ARTHUR E. Asst. Sect., Appleton Water Commission, City Hall, Appleton, Wis.....	Apr. 4, 1929
P DISHER, ROBERT J. Northwest Mgr., Pacific States Cast Iron Pipe Co., Spalding Bldg., Portland, Ore.....	June 10, 1930
AW DITTOE, W. H. Chief Engr., Mahoning Valley San. District, Youngstown, O.....	May 28, 1914
DIVEN, JOHN M. The Leadite Co., 3445 84th St., Jackson Heights, L. I., N. Y.....	June 17, 1913
PW DIXON, G. GALE. Cons. Engr., Home Savings & Loan Bldg., 275 W. Federal St., Youngstown, O.....	June 21, 1920
DIXON, JAS. I. Supt., Water Dept., 401 Benton St., Santa Clara, Calif.....	May 14, 1926
W DIXON, LEON S., M.E. Box B. F. 366, Washington, D. C....	Feb. 20, 1931
DOANE, NORMAN D. 500 Queens Road, Charlotte, N. C.....	Sept. 28, 1931
DAPW DOBBIN, R. L. Gen. Mgr., Peterborough Utilities Commission, 295 Reid St., Peterborough, Ont., Canada.....	Feb. 28, 1923
W DODD, RENNIE I. Chester Water Service Co., Box 67, Chester, Pa.....	Apr. 10, 1922
P DODGE, FRED L. Dist. Mgr., California Water Service Co., 4163 Whittier Blvd., Los Angeles, Calif.....	July 22, 1926
DOLAND, JAMES J. Assoc. Prof. of Civil Engineering, University of Illinois, 317 Engineering Hall, Urbana, Ill....	Nov. 15, 1929

	Joined
W DOMOGALLA, DR. BERNHARD. Chemist, University Club, 803 State St., Madison, Wis.....	Feb. 17, 1926
PW DONAHUE, THOMAS F. Div. of Water Safety Control, Navy Pier, Fort Dearborn Station, Chicago, Ill.....	Apr. 2, 1930
DONALDSON, EDGAR F. Chief Engr., Annapolis Water Works, R. D. No. 1, Box 66, Defense Highway, Annapolis, Md...	Feb. 10, 1932
W DONALDSON, WELLINGTON. Fuller & McClintock, Cons. Engrs., 11 Park Place, New York, N. Y.....	Apr. 29, 1910
P DONNAN, WILLIAM C. Div. Supt., Bureau of Water, 412 City- County Bldg., Pittsburgh, Pa.....	Apr. 16, 1930
DONOHUE, JERRY. Pres., Donohue Engineering Co., She- boygan, Wis.....	June 20, 1922
DOOLEY, R. J. 35 Lathrop Ave., Le Roy, N. Y.....	Feb. 21, 1933
A DORER, A. B. Public Accountant, 170 Broadway, New York, N. Y.....	Oct. 31, 1928
APW DORR, GEO. B. Supt., Water Dept., 110 W. Dayton Ave., Dayton, Wash.....	July 24, 1934
APW DORRANCE, FRANK Y. Div. Engr., Montreal Water Board, 341 Brock Ave., No., Montreal, West, Que., Canada...	July 14, 1920
PW DORSEY, STANTON L. San. & Chem. Engr., 1427 Eye St., Room 800, Washington, D. C.....	May 28, 1924
DOTO, JOSEPH A. Member, Board of Water Commissioners, 2213 Tatnall St., Wilmington, Del.....	Oct. 27, 1933
DOUGHERTY, BEN. R. Supt., Richmond Water & Light Co., Richmond, Ky.....	Apr. 16, 1924
PW DOUGHERTY, D. J. Supt., Talladega Light & Water Com- mission, Talladega, Ala.....	May 12, 1925
DOW, ALEX. Pres., Detroit Edison Co., 2000 Second Ave., Detroit, Mich.....	Aug. 4, 1919
W DOWD, JOHN E. Director, Dept. of Sanitation, Pease Labora- tories, Inc., 39 W. 38th St., New York, N. Y.....	Mar. 4, 1922
W DOWNER, T. B. Chief Engr. & Supt., Alhambra Water Dept., 210 S. Fifth St., Alhambra, Calif.....	Apr. 9, 1925
PW DRAKE, ALAN D. Director, Div. of Water, 107 City Hall, Buffalo, N. Y.....	Jan. 31, 1934
APW DRAKE, WILLIAM O. City Engr., Supt. of Public Works, City Hall, Corning, N. Y.....	Apr. 30, 1917
PW DRIGGS, EDWIN L. Office Engr., East Bay Municipal Utility District, 512-16th St., Oakland, Calif.....	May 23, 1933
PW DRUAR, JOHN F. Cons. Engr., 500 Globe Bldg., St. Paul, Minn.....	Nov. 18, 1919
P DUDLEY, HOUSTON M. Salesman, Belyea Truck Co., 6800 Alameda St., Los Angeles, Calif.....	Sept. 30, 1929
DUFFY, JAMES M. Village Engr., Mamaroneck, N. Y.....	June 6, 1922
DUGGER, EUGENE F. Gen. Mgr., Newport News Waterworks Commission, Newport News, Va.....	May 17, 1924
DUKE, THOMAS A. Pres., Maysville Water Co., 207 Court St., Maysville, Ky.....	June 30, 1929
DUNCAN, D. L. Dist. Mgr., California Water Service Co., 615 Estudillo St., Martinez, Calif.....	Aug. 30, 1930
AP DUNHAM, F. E. Dist. Mgr., Peoples Water Service Co., Wal- terboro, S. C.....	Apr. 22, 1930
W DUNHAM, HENRY G. Bacteriologist, 920 Henry St., Detroit, Mich.....	June 16, 1925
PW DUNN, STEPHEN M. Asst. Mech. Engr., Dept. of Water & Power, 207 S. Broadway, Los Angeles, Calif.....	Sept. 8, 1931
W DUNN, WILLIAM C. Supt., Mt. Hope Filter Plant, Box 1441, Cristobal, C. Z.....	Nov. 12, 1919
DUNSTAN, GILBERT H. Asst. Prof. in General Engineering, Univ. of Southern California, Los Angeles, Calif.....	July 13, 1931

		Joined
	PW DUNWOODY, J. S. Supt., Water Dept., Erie, Pa.....	June 5, 1913
17, 1926	W DURBIN, W. H., C.E. Asst. Mgr., Terre Haute Water Works Co., 634 Cherry St., Terre Haute, Ind.....	May 23, 1923
2, 1930	AP DURLAND, SMITH N. Asst. Treas., Long Island Water Corp., 337 Merrick Road, Lynbrook, L. I., N. Y.....	Jan. 29, 1914
10, 1932	DWYER, JOHN D. Chairman, Water & Sewer Board, 110 S. Border Road, Medford, Mass.....	May 24, 1922
29, 1910	PW EARL, RALPH. Earl Engineering Co., 1207 American Bank Bldg., New Orleans, La.....	June 6, 1916
16, 1930	EAST, L. A. Supt. of Water Works, Savannah, Ga.....	Nov. 30, 1929
20, 1922	EASTERDAY, E. E. Chief Civil Engr., Supply & Purifying Section, Water Div., 4039 Flad Ave., St. Louis, Mo....	May 29, 1926
21, 1933	EBERLING, CARL A. Asst. Supt., Water Dept., City Hall, Cincinnati, O.....	June 13, 1934
31, 1929	PW EBERT, RAYMOND E. Chemist, Munic. Sewage Treatment Works, Winston-Salem, N. C.....	Dec. 21, 1933
24, 1934	APW ECKART, NELSON A. Gen. Mgr., Water Dept., 425 Mason St., San Francisco, Calif.....	Mar. 11, 1930
14, 1920	APW ECKERT, ALFRED. Supt. of Filtration, Saginaw Water Works, Saginaw, Mich.....	Oct. 14, 1929
8, 1924	APW EDDY, HARRISON P. Cons. Engr., Metcalf & Eddy, Cons. Engrs., 1300 Statler Bldg., Boston, Mass.....	May 20, 1925
17, 1933	APW EDDY, HARRISON P., JR. Cons. Engr., Metcalf & Eddy, Cons. Engrs., 1300 Statler Bldg., Boston, Mass.....	Apr. 28, 1930
6, 1924	EDDY, JUSTUS B. Engr., Water Pipe Extension, 404 City Hall, Chicago, Ill.....	June 21, 1926
2, 1925	APW EDWARDS, GAIL P. 393 Broadway, Cambridge, Mass.....	July 21, 1934
4, 1919	EDWARDS, WILLIAM R. Vice Pres., New York Water Service Corp., 722 Reynolds Arcade, Rochester, N. Y.....	Apr. 2, 1914
4, 1922	EGAN, J. H. Crane Co., 321 E. Third St., Los Angeles, Calif...	Oct. 2, 1931
9, 1925	W EHLE, JOHN A. Village Engr., Municipal Hall, Rye, N. Y....	May 10, 1930
1, 1934	PW EHLERS, V. M. Chief San. Engr., State Dept. of Health, Austin, Tex.....	Oct. 18, 1927
1, 1917	EISERT, W. LOTHAR. Chief Engr., Central Division, North-eastern Water & Electric Service Corp., c/o Riverton Consolidated Water Co., Lemoyne, Pa.....	Apr. 6, 1934
1, 1933	W ELDER, ALBERT L. Asst. Prof. of Chemistry, Syracuse University, Bowne Hall, Syracuse, N. Y.....	Sept. 18, 1928
1, 1919	P ELDER, CLAYBURN C. Hydrographic Engr., Metropolitan Water District of S. Calif., 306 W. 3rd St., Los Angeles, Calif.....	Aug. 6, 1931
1, 1929	ELDRIDGE, H. D. Treas., Princeton Water Co., Princeton, N. J.....	Apr. 14, 1916
1, 1922	APW ELLENDT, JOHN G. Commissioner of Public Works, City Hall Annex, 54 Court St., Rochester, N. Y.....	Apr. 27, 1932
1, 1924	ELLIOTT, EARL C. Pres., California Water Service Co., Federal Reserve Bank Bldg., San Francisco, Calif.....	July 31, 1928
1, 1928	ELLIOTT, G. A. Cons. Engr., 1104 Merchants Exchange Bldg., San Francisco, Calif.....	May 15, 1918
1, 1930	W ELLIOTT, WILSON D. Chemist & Bacteriologist, Water Works, Ottumwa, Iowa.....	Jan. 22, 1931
1, 1930	ELLIS, GEORGE R. Canandaigua, N. Y.....	July 18, 1907
1, 1925	AP ELLIS, N. RANDALL. Valuation Engr., City Attorney's Office, 206 City Hall, San Francisco, Calif.....	June 9, 1920
1, 1931	W ELLMS, JOSEPH W. Engr., Water Purification & Sewage Disposal, Dept. of Public Utilities, City Hall, Cleveland, O..	Oct. 21, 1919
1, 1919	ELLSWORTH, FRED D. Local Mgr., California Water Service Co., 132 Main St., Petaluma, Calif.....	Oct. 10, 1927
1, 1931	P ELLSWORTH, HARRY. Supt., Water & Light Dept., Meadville, Pa.....	July 18, 1907

	Joined
PW ELLSWORTH, SAMUEL M. Cons./Engr., 12 Pearl St., Boston, Mass.....	Apr. 28, 1930
W ELROD, HENRY E. Cons. Engr., 316 Petroleum Bldg., Houston, Tex.....	Feb. 2, 1916
AP ELTING, OSCAR R. Asst. Engr., Bureau of Water Supply, 403 Municipal Bldg., Akron, O.....	Feb. 15, 1930
APW ELY, HOWARD M. Supt., Water Co., Danville, Ill.....	June 8, 1909
W EMERSON, C. A., JR. 96 N. Walnut St., East Orange, N. J....	May 12, 1908
W EMERSON, FRANK. 65 Gates St., Lowell, Mass.....	Nov. 12, 1919
ENANDER, E. H. Engr. of Distribution, Public Service Co. of Northern Illinois, 75 W. Adams St., Chicago, Ill.....	June 27, 1922
AP END, CHARLES F. Supt., Raritan Township Water Dept., Route No. 19, New Brunswick, N. J.....	May 26, 1930
END, WILLIAM F. Civil Engr., 2 Georgian Court, Troy, N. Y.	Jan. 19, 1926
W ENGEL, P. N. Pres., International Filter Co., 59 E. Van Buren St., Chicago, Ill.....	June 12, 1919
W ENGER, M. L. Dean of College of Engineering & Director of Engineering, Experiment Station, University of Illinois, Urbana, Ill.....	Mar. 11, 1915
PW ENGLE, JAMES W. Chem. Engr., 107 S. Clarendon Ave., Clarendon, Va.....	Sept. 4, 1923
ENGLISH, JAMES A. City Engr. & Supt. of Water Works, Salisbury, N. C.....	Dec. 21, 1933
W ENSLOW, LINN H. Editor, "Water Works & Sewerage," 420 Lexington Ave., New York, N. Y.....	Aug. 16, 1918
ERICKSON, D. L. City Engr., Lincoln, Neb.....	June 30, 1924
ERWIN, THAD M. Water Sales Agent, Dept. of Water & Power, 207 S. Broadway, Los Angeles, Calif.....	Sept. 8, 1931
P ESTY, ROGER W. Supt., Water Dept., 17 Hobart St., Danvers, Mass.....	Mar. 1, 1924
PW EVANS, EDMUND B. Senior Chemist & Bacteriologist, Water Works, 1215 Elgin Place, Mt. Adams, Cincinnati, O.....	Jan. 27, 1927
PW EVANS, G. TAYLOR. Mgr., Ohio Water Service Co., Struthers, O.....	Apr. 6, 1928
EVANS, WILLIAM J. Filter Plant Operator, Box 819, Oxford, N. C.....	Apr. 16, 1930
EVERETT, CHESTER M. Fuller & Everett, Cons. Engrs., 22 E. 40th St., New York, N. Y.....	May 10, 1915
EVERETT, JASPER W. Vice Pres., Springfield City Water Co., Boonville Ave. & Chestnut St., Springfield, Mo.....	May 5, 1922
EVERETTE, DR. WILLIS E. P. O. Box 188, San Rafael, Calif....	Dec. 29, 1913
W EWRY, RAY C. Mech. Engr., Board of Water Supply, 346 Broadway, New York, N. Y.....	Apr. 4, 1924
PW EYER, CLAUDE W. Supt., Water Dept., City Hall, Glendive, Mont.....	Feb. 10, 1931
EYMER, HERMAN H. City Engr., Saginaw, Mich.....	June 4, 1912
W FAGER, E. P. Dearborn Chemical Co., 310 S. Michigan Ave., Chicago, Ill.....	Aug. 5, 1920
P FAGUE, HUGH F. Gen. Foreman, Bureau of Water Works, 1900 N. Interstate Ave., Portland, Ore.....	May 17, 1933
APW FAIR, GORDON M. Assoc. Prof. of San. Engineering, Harvard University, 112 Pierce Hall, Cambridge, Mass....	Jan. 26, 1925
P FAIRBAIRN, JOHN M. Inspection Engr., Chas. Warnock & Co., 1135 Beaver Hall Hill, Montreal, Que., Canada....	Apr. 23, 1934
W FALES, ALMON L. Metcalf & Eddy, Cons. Engrs., 1300 Statler Bldg., Boston, Mass.....	Feb. 26, 1921
FARQUHARSON, ALEX L. Mgr., Brockville Public Utilities, Victoria Hall, Brockville, Ont., Canada.....	Mar. 8, 1924
AP FARRELL, WM. J. Treas.-Comptroller, Societe Anonyme Hellinique des Eaux, 2 America St., Athens, Greece.....	Mar. 27, 1930

Joined

Joined

28, 1930	APW FARRER, ARTHUR. Chief Engr., Ballarat Sewerage Authority, Grenville St., Ballarat, Victoria, Australia.....	June 19, 1934
2, 1916	FAULKNER, A. T. Mgr., Ashtabula Water Works Co., 56 Park St., Ashtabula, O.....	Jan. 23, 1929
15, 1930	FAW, CLAUDE T. California Corrugated Culvert Co., 600 Haddon Road, Oakland, Calif.....	Nov. 9, 1929
8, 1909	APW FEENEY, A. J. Asst. Engr., Water Dept., Wilmington, Del....	Apr. 30, 1919
12, 1908	FEIST, MARTIN. Supt., Machinery Equipment, Water Works, Dayton's Bluff, Station B. 4, St. Paul, Minn.....	May 13, 1919
12, 1919	A FELIX, GEORGE H. Ex. Pres., Reading Board of Water Commissioners, Retired, 138 N. 9th St., Reading, Pa.....	Sept. 7, 1893
27, 1922	PW FENKELL, GEORGE H. Supt. & Gen. Mgr., Board of Water Commissioners, 735 Randolph St., Detroit, Mich.....	June 21, 1920
26, 1930	A FENN, N. FREDERICK Gen. Mgr., South Bay Consolidated Water Co., Bay Shore, L. I., N. Y.....	Nov. 5, 1927
19, 1926	FENTON, M. F. Los Angeles Mgr., Walles Dove-Hermiston Corp., 2461 E. 8th St., Los Angeles, Calif.....	Dec. 9, 1932
12, 1919	PW FERGUSON, G. H., B. A. Sc. Chief Engr., Dept. of Health, Elgin Bldg., Ottawa, Ont., Canada.....	Mar. 19, 1925
11, 1915	PW FERGUSON, HARRY F. Chief Engr., State Dept. of Health, Room 601, The Capitol, Springfield, Ill.....	Nov. 9, 1914
4, 1923	W FEWELL, J. H. Engr. & Supt. of Construction, Jackson Water Works, Jackson, Miss.....	June 17, 1926
21, 1933	P FIEDLER, ALBERT G. Div. of Ground Water, U. S. Geological Survey, Washington, D. C.....	Jan. 8, 1929
16, 1918	W FIELD, FREDERICK E. Engr., Water Board, 135 Ballantyne Ave., Montreal, West, Que., Canada.....	June 21, 1920
30, 1924	APW FIELD, H. L. Supt., Water Dept., Greenfield, Mass.....	June 5, 1929
8, 1931	APW FIELD, WILLIAM T., C.E. Pres., The William T. Field Engrs., Inc., Flower Bldg., Watertown, N. Y.....	Apr. 27, 1910
1, 1924	W FILBY, E. L. Black & Veatch, Cons. Engrs., Mutual Bldg., Kansas City, Mo.....	Feb. 7, 1922
7, 1927	PW FINCH, LEWIS S. Civil Engr., 3338 Park Ave., Indianapolis, Ind.....	Oct. 16, 1933
6, 1928	W FINCH, RONALD M. Div. Mgr., Wallace & Tiernan Co., Inc., 414 Flour Exchange Bldg., Minneapolis, Minn.....	May 26, 1925
6, 1930	AP FINDLAY, R. E. Sect.-Treas., Board of Water Commissioners, City Hall, Macon, Ga.....	Apr. 22, 1929
0, 1915	W FINK, G. J. Director of Research, Chicago Chemical Co., 6216 W. 66th Place, Chicago, Ill.....	Apr. 8, 1924
5, 1922	FINKLE, F. C. Cons. Engr., 346 E. San Fernando Blvd., Burbank, Calif.....	June 24, 1912
9, 1913	APW FINNERAN, GEO. H. Supt., Water Service, 710 Albany Ave., Boston, Mass.....	Feb. 18, 1921
5, 1924	PW FISCHER, FRED J. Chief Mech. Engr., Dept. of Water & Power, 207 So. Broadway, Los Angeles, Calif.....	Sept. 30, 1929
1, 1931	FISHER, L. A. Supt., Board of Water & Light Commission, Concord, N. C.....	Jan. 27, 1914
1, 1912	W FISSTEIN, MAX. 59 E. Van Buren St., Chicago, Ill.....	Dec. 29, 1927
1920	FITZGERALD, GERALD C. Civil & Hyd. Engr., 625 Rowan Bldg., Los Angeles, Calif.....	Apr. 16, 1929
1933	FITZGERALD, JOHN M. Div. Engr., Board of Water Supply of New York City, 32-14 Broadway, Long Island City, N. Y.....	Dec. 19, 1930
1925	FLAA, INGWALD E. Hyd. Engr., San Francisco Water Dept., 425 Mason St., San Francisco, Calif.....	May 14, 1915
1934	FLACK, HORACE E. Executive, Dept. of Legislative Reference, City Hall, Baltimore, Md.....	June 16, 1919
1921	P FLANNERY, WILLIAM, M.E. Dept. of Water Supply, Gas & Electricity, 313 Park Place, Brooklyn, N. Y.....	May 9, 1921

	Joined
FLEMING, VIRGIL R. 219 Materials Testing Lab., University of Illinois, Urbana, Ill.	Apr. 14, 1915
PW FLENTJE, MARTIN E. Westmoreland Water Co., Greensburg, Pa.	Mar. 27, 1926
PW FLOYD, JOHN E. State Board of Health, 164 Pennsylvania Ave., West Asheville, N. C.	Jan. 11, 1900
P FOLGER, COLLAMES C. Gen. Mgr., Public Utilities Commission, Kingston, Ont., Canada.	Mar. 27, 1934
PW FOOTE, HERBERT B. Director, Div. of Water & Sewage, State Board of Health, Helena, Mont.	Aug. 1, 1923
FORD, A. J. 4024 Country Club Drive, Los Angeles, Calif.	Sept. 22, 1931
PW FORD, J. W. Engr., San Jose Water Works, 374 W. Santa Clara St., San Jose, Calif.	Jan. 26, 1924
W FORD, T. B., JR. Mgr., Atlanta Office, Dorr Co., Inc., 1665 Noble Drive, N. E., Atlanta, Ga.	Oct. 30, 1931
FOREMAN, CHARLES S. Pres., Smith Brothers Construction Corp., 841 New York Life Bldg., Kansas City, Mo.	June 21, 1920
W FOREMAN, MERLE S. Biologist, State Board of Health, 825 Cragmont Ave., Berkeley, Calif.	Jan. 17, 1928
APW FORGEY, CARL S. Technical Dept., East Bay Municipal Utility District, 512-16th St., Oakland, Calif.	June 13, 1933
PW FORSBERG, OLE. Chemist, Oliver Iron Mining Co., Hibbing, Minn.	Mar. 14, 1921
APW FOSTER, CHARLES. Cons. Engr., 512 Selwood Bldg., Duluth, Minn.	June 9, 1919
APW FOSTER, WILLARD S. Civil Engr., 2742 Hudson Blvd., Jersey City, N. J.	July 1, 1933
W FOULK, C. W. Prof. of Analytical Chemistry, Ohio State University, Columbus, O.	June 17, 1926
APW FOUTZ, CHARLES C. Supt., Laporte Water Works, 212 Holcomb St., La Porte, Ind.	Feb. 23, 1926
W FOWLER, EDWARD A. 366 Pine St., New Orleans, La.	Apr. 27, 1910
APW FOX, CHAS. L. Asst. Supt., Pennsylvania Water Co., 712 South Ave., Wilkinsburg, Pa.	June 4, 1912
W FOX, PAUL S. San. Engr., Bureau of Public Health, P. O. Box 750, Santa Fe, N. M.	Oct. 31, 1924
PW FRANCIS, JAMES G. Civil Engr., Los Angeles Dept. of Water & Power, 148 Laurel Drive, Altadena, Calif.	Oct. 28, 1931
W FREEBURN, H. M. Dist. Engr., State Dept. of Health, Cloverly Apartments, 437 W. School Lane, Germantown, Philadelphia, Pa.	May 5, 1922
FREER, W. D. American Water Works & Electric Co., 50 Broad St., New York, N. Y.	Mar. 8, 1924
W FRENCH, DUDLEY K. 503 Hawthorne Lane, Winnetka, Ill.	May 25, 1919
FRENCH, E. V., M.E. 185 Franklin St., Boston, Mass.	July 10, 1906
APW FRENCH, R. DeL. Prof. of Highway & Munic. Engineering, McGill University, Montreal, Que., Canada.	Apr. 16, 1930
P FRICKER, EMILE. Asst. to Mgr., Hackensack Water Co., 624 Park Ave., Weehawken, N. J.	Mar. 13, 1925
PW FRIEDMAN, SAMUEL. Chemist, Ashokan Laboratory, Ashokan, N. Y.	Nov. 9, 1929
APW FRIEL, FRANCIS S. Vice Pres. & Treas., Albright & Friel, 246 S. Fifteenth St., Philadelphia, Pa.	Mar. 22, 1926
FRIEND, R. O. Pres., Lakeside Engineering Corp., 176 W. Adams St., Chicago, Ill.	Mar. 10, 1928
FRISK, PAUL W. Chem. Engr. Chief of Chemical Laboratory, American Enka Corp., Box 45, Enka, N. C.	Mar. 13, 1929
W FRITZ, WILLIAM G. Contractor, West Orange, N. J.	May 28, 1924
PW FRY, JAMES H. Chief Chemist, Filtration Plant, Route 1, Lebanon Road, Nashville, Tenn.	July 12, 1934

Joined

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Joined

FRYE, HORACE R. Chemist in Charge, Filtration Plant, Sheridan Rd. & Lincoln St., Evanston, Ill.

Mar. 26, 1934

W FRYE, S. M. Supt. of Filtration, Rome, Ga.

Apr. 12, 1929

APW FULKMAN, JOHN A. Hyd. Engr., Consoer, Older & Quinlan, Inc., 1322 Engineering Bldg., Wacker Drive & Wells St., Chicago, Ill.

July 31, 1928

APW FULLER, HARRY U. Chief Engr., Portland Water District, 16 Casco St., Portland, Me.

Aug. 16, 1932

FULLER, WESTON E. Fuller & Everett, Cons. Engrs., 22 E. 40th St., New York, N. Y.

May 27, 1922

W FURMAN, ROBERT W. Chief Chemist, Water Purification Works, 1443 Kenyon Drive, Toledo, O.

May 25, 1922

GABOURY, M. A. Inspector of Water Purification Plants, Provincial Bureau of Health, 89 Notre Dame St., E., Montreal, Que., Canada.

Jan. 10, 1934

GABY, FREDERICK A. Chief Engr., Hydro-Electric Power Commission of Ontario, 190 University Ave., Toronto, Ont., Canada.

Feb. 8, 1916

P GAFFNEY, C. J. Water Meter Repairs, 299 Myrtle Ave., Brooklyn, N. Y.

June 17, 1926

PW GALE, P. C. Engr. in Charge, Dept. of Water Works, 321 Franklin St., Michigan City, Ind.

Apr. 16, 1934

W GALLAGHER, H. A. Mgr., Water Co., Independence, Mo.

June 8, 1909

PW GALLAHER, WM. U. Supt., Water Works, Appleton, Wis.

Mar. 13, 1925

PW GALVIN, THOS. E. Dist. Mgr., Wallace & Tiernan Co., Inc., 3923 W. 6th St., Los Angeles, Calif.

Aug. 8, 1931

AP GAMA, ING. JOSE. Av. Chapultepec 27, Mexico City, Mexico.

June 12, 1933

APW GARCIA, RAUL R. Chief Engr., Common Council of Cascaes, R. Dos Navegantes 65, Cascaes, Portugal.

May 25, 1933

P GARLAND, J. J. Engr., Community Water Service Co., 100 William St., New York, N. Y.

June 5, 1934

W GARMAN, H. O. Cons. Engr., 2062 N. Meridian St., Indianapolis, Ind.

May 30, 1916

GARRATT, JAMES E. Designing Engr., Div. of Water, City Hall Annex, Room 101, Newark, N. J.

May 26, 1930

W GASCOIGNE, GEORGE B. Cons. San. Engr., 1149 Leader Bldg., Cleveland, O.

June 16, 1920

GATES, H. V. Pres., Hillsboro Power & Investment Co., Hillsboro, Ore.

June 7, 1904

PW GATES, JUSTIN F. Commissioner of Public Works, City Hall, Middletown, N. Y.

Feb. 20, 1931

APW GAUER, PAUL G. Chief Engr., City Water Dept., 315 N. Hancock St., Madison, Wis.

May 31, 1930

W GAUSMANN, R. W. Ulen & Co., No. 8, Caragheorghi St., Athens, Greece.

Mar. 12, 1924

W GAVETT, WESTON. San. & Hyd. Engr., 973 Kenyon Ave., Plainfield, N. J.

Nov. 10, 1914

W GAYTON, L. D. Asst. City Engr., 402 City Hall, Chicago, Ill.

Oct. 9, 1924

PW GEAR, PATRICK. Supt., Water Dept., Holyoke, Mass.

June 24, 1913

GEFFERS, PETER. Supt., Water Dept., City Hall Bldg., Room 8, Oshkosh, Wis.

Apr. 10, 1931

PW GELSTON, W. R. Supt., Water Works Commission, Quincy, Ill.

May 7, 1907

GEMPERLE, P. F. Metropolitan Water District of Southern California, 306 W. 3rd St., Los Angeles, Calif.

Aug. 11, 1930

APW GEORGALAS, ANDREW C. Director & Chief Engr., Societe des Eaux, 2, America St., Athens, Greece.

July 8, 1930

GEORGE, J. M. Supt., Light & Water Dept., Thomaston, Ga.

Jan. 25, 1934

W GEORGIA, FREDERICK R. Black Mountain College, Blue Ridge, N. C.

May 16, 1919

	Joined
GERBER, WINFRED D. Engr., State Water Survey Div., Room 57, Chemistry Bldg., Urbana, Ill.....	Apr. 12, 1929
PW GERSTEIN, H. H. San. Engr., Dept. of Public Works, 8417 Drexel Ave., Chicago, Ill.....	Dec. 24, 1925
W GETTRUST, J. S. Supt., Akron Filtration Plant, Kent, O.....	June 8, 1921
W GEUPEL, LOUIS A. 3810 Central Ave., Apt. 16, Indianapolis, Ind.....	Nov. 28, 1922
W GIBBONS, MORTIMER M. Supervisor, Water Filtration Plant, Box 162, Rahway, N. J.....	Nov. 9, 1922
DAPW GIBSON, JAMES E. Mgr. & Engr., Water Dept., 14 George St., Charleston, S. C.....	May 1, 1922
P GIDLEY, HENRY T. Supt., Fairhaven Water Co., Fairhaven, Mass.....	May 23, 1923
GIESEY, J. K. Engr., Rockford San. District, 3300 Kishwaukee St., Rockford, Ill.....	Sept. 30, 1919
W GILCREAS, F. WELLINGTON. Assoc. San. Chemist, Div. of Laboratories & Research, State Dept. of Health, New Scotland Ave., Albany, N. Y.....	Apr. 4, 1924
APW GILCRIST, CHAS B. Supt., Water Dept., Dubois & Carter Sts., Newburgh, N. Y.....	May 25, 1922
W GILL, C. S. Supt., Carbondale Munic. Water Works, 206 W. Main St., Carbondale, Ill.....	Mar. 13, 1928
A GILL, JOSEPH. Accountant, 74 Trinity Place, New York, N. Y.....	Jan. 22, 1930
W GILLESPIE, C. G. Chief, Bureau of San. Engineering, Dept. of Public Health, 3093 Life Sciences Bldg., Berkeley, Calif.....	June 10, 1911
P GILMAN, N. A. City Water Supt., Yakima, Wash.....	June 6, 1934
PW GINTER, CLARENCE M. Supt., Water Dept., City Hall Bldg., Harvey, Ill.....	June 23, 1931
W GLACE, I. M. Dist. Engr., State Dept. of Health, 22 S. 22nd St., Harrisburg, Pa.....	Nov. 30, 1921
GLANNAN, PETER H. Supt., Commonwealth Water Co., W. O. Div., 22 Northfield Road, West Orange, N. J.....	June 8, 1921
PW GLASSBROOK, E. F. Local Mgr., Water Dept., Public Utilities California Corp., Niles, Calif.....	Apr. 16, 1930
GOBLE, W. F. Mgr., San Gabriel Valley Water Co., 7 S. First St., Alhambra, Calif.....	June 17, 1926
W GODFROY, F. G. Supt., Water & Light Plant, New Bern, N. C.....	May 17, 1923
W GOHIER, ERNEST, C.E. Cons. Engr., 10 E. St. James St., Montreal, Que., Canada.....	Jan. 1, 1934
PW GOLDEN, A. T. Water Treatment Plant Operator, Los Angeles Dept. of Water & Power, 327 W. I St., Wilmington, Calif.....	Apr. 13, 1933
PW GOLDSMITH, CLARENCE. National Board of Fire Underwriters, 222 W. Adams St., Chicago, Ill.....	Dec. 27, 1915
W GOOCH, W. T., Ph.D. Prof. of Chemistry, Baylor University, Chemist, Waco City Water Works, 808 Speight Ave., Waco, Tex.....	Apr. 20, 1925
W GOOD, TIMOTHY W. Supt., Water Works, Cambridge, Mass.....	Feb. 7, 1920
GOODALE, LEON A. Water Commissioner & Registrar, Room 19, City Hall, Worcester, Mass.....	Mar. 13, 1929
W GOODELL, J. E. Chemist, 444 Woolworth Bldg., Lancaster, Pa.....	Apr. 4, 1924
P GOODING, GERALD J. Construction Supt., New Rochelle Water Co., New Rochelle, N. Y.....	June 10, 1930
APW GOODMAN, JOSEPH. Asst. Engr., Bureau of Water Supply, Municipal Bldg., New York, N. Y.....	Apr. 16, 1930
APW GORDON, F. G. Gordon & Bulot, Cons. Engrs., 53 W. Jackson Blvd., Chicago, Ill.....	June 8, 1921
DW GORMAN, ARTHUR E. Engr. of Filtration, Bureau of Engineering, City Hall, Chicago, Ill.....	Mar. 25, 1924

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Joined

GORMAN, RICHARD C., JR. Engr., State Dept. of Health, 1931 N. Third St., Harrisburg, Pa.	May 8, 1929
W GOTTLIEB, SELMA. Chemist, Water Laboratory, State Board of Health, Lawrence, Kans.	May 23, 1933
GOUDELOCK, PAUL M. Chemist, City Water Works, 76 W. Washington St., Gainesville, Ga.	May 31, 1933
W GOUDEY, RAY F. San. Engr., Dept. of Water & Power, Box 240, Arcade Annex, Los Angeles, Calif.	Apr. 30, 1918
AP GRABB, GEORGE W. Water Works Supt., Chesley, Ont., Canada.	Mar. 5, 1932
PW GRAF, AUGUST V. Chief Chem. Engr., Water Purification Plants, Howard Bend Station, Chesterfield, Mo.	June 15, 1914
GRAFF, FRANK. Water Works Supt., Public Utilities Com- mission, Cochrane, Ont., Canada.	Jan. 31, 1934
GRAHAM, GRANVILLE E. Supt., San Pablo Filter Plant, East Bay Municipal Utility District, 245 Berkeley Park Blvd., Berkeley, Calif.	June 27, 1933
GRANT, BURTON S. Civil Engr., Dept. of Water & Power, 1826 Holly Vista Ave., Los Angeles, Calif.	Oct. 1, 1934
AP GRANT, J. W., JR. 436 N. Shine St., Orlando, Fla.	June 19, 1929
APW GRANT, W. K. Munic. Engr., Louisiana Fire Prevention Bureau, 609 Canal Bank Bldg., New Orleans, La.	May 12, 1925
GRAY, HAROLD F. San. & Hyd. Engr., 2540 Benvenue St., Berkeley, Calif.	Aug. 28, 1933
W GREELEY, SAMUEL A. Greeley & Hansen, Cons. Engrs., 6 N. Michigan Ave., Chicago, Ill.	July 11, 1907
PW GREEN, CARL E. State San. Engr., 816 Oregon Bldg., Port- land, Ore.	July 28, 1933
AP GREEN, E. W. Sect., San Jose Water Works, 374 W. Santa Clara St., San Jose, Calif.	Oct. 27, 1925
W GREEN, F. W. Supt. of Filtration & Pumping, Passaic Valley Water Commission, Little Falls, N. J.	Dec. 22, 1915
GREEN, FRED. Senior Chemist, Water Treatment Section, London & North Eastern Railway, Stratford, London, E. 15, England.	Dec. 15, 1933
W GREEN, PAUL E. Civil & San. Engr., 400 N. Michigan Ave., Chicago, Ill.	Apr. 14, 1915
W GREEN, T. C. City Filtration Plant, Austin, Tex.	Apr. 27, 1925
PW GREENFIELD, R. E. Chemist, A. E. Staley Mfg. Co., Decatur, Ill.	Nov. 22, 1926
GREENLEE, J. L. Asst. Supt., Munic. Water Dept., Char- lotte, N. C.	June 17, 1926
W GREER, WILLARD N. Research Chemist, Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.	Apr. 29, 1926
GREGG, CHARLES J. R. D. No. 1, Bradford, Pa.	Oct. 1, 1934
W GREGORY, JOHN H. Cons. Engr., Prof. of Civil & San. Engi- neering, Johns Hopkins University, Baltimore, Md.	Apr. 1, 1910
PW GRIER, MURRAY M. Supt. of Filtration, 126 E. Water St., Statesville, N. C.	Jan. 11, 1930
W GRIFFEY, H. A. Mgr., Water Dept., City Hall, Janesville, Wis.	June 14, 1920
PW GRIFFIN, ATTMORE E. Analyst, North Jersey District Water Supply Commission, Pompton Plains, N. J.	May 8, 1930
AP GRIFFIN, H. K. Div. Mgr., California Water Service Co., Federal Reserve Bank Bldg., San Francisco, Calif.	Sept. 26, 1927
W GRIFFITHS, JAMES G. Supt., Kensington Water Co., Box 143, New Kensington, Pa.	Oct. 31, 1924
W GRIME, EDWIN M. Engr. of Water Service, Northern Pacific Railway, St. Paul, Minn.	July 10, 1926

	Joined
W GRIMES, EDWIN L. Mgr., J. B. McCrary Engineering Corp., 798 Vedado Way, N. E., Atlanta, Ga.	Feb. 23, 1920
APW GRIMMER, ALLAN K. Town Engr., Canadian International Paper Co., Temiskaming, Que., Canada.	June 2, 1920
APW GRINNELL, CARL H. Supt. & Chief Engr., Water & Light Station, Monroe & Coldbrook Sts., Grand Rapids, Mich.	May 31, 1930
GRISWOLD, HAROLD W. Deputy Chief Engr., Board of Water Commissioners, 1026 Main St., Hartford, Conn.	June 12, 1929
PW GRISWOLD, LAWRENCE J. Engr., Consolidated Water Co., 712 Washington St., Utica, N. Y.	Mar. 31, 1933
AP GROBBEL, DANIEL C. Sect., Board of Water Commissioners, 735 Randolph St., Detroit, Mich.	Oct. 17, 1920
GRONER, E. C. Installation Engr., Sloan Valve Co., 4300 W. Lake St., Chicago, Ill.	Oct. 11, 1923
GROSS, C. P. Mgr., Water & Electric Dept., Box 87, Wisconsin Rapids, Wis.	July 31, 1924
GROSS, DWIGHT D. Chief Engr., Board of Water Commissioners, Box 629, Denver, Colo.	July 29, 1925
GROSSMAN, FRANK. Room 866, 122 S. Michigan Ave., Chicago, Ill.	Mar. 7, 1934
GROSZ, GEORGE. Mgr., Public Utilities Commission, Town Hall, Waterloo, Ont., Canada.	Apr. 28, 1933
APW GROVES, J. N. Supt., Water Works, Canton, Ga.	May 15, 1930
GRUETZMACHER, CLARENCE S. Engr. of Distribution, Water Works, City Hall, Milwaukee, Wis.	June 5, 1920
PW GRUNSKY, C. E., JR. Gen. Supt., East Bay Municipal Utility District, 512—16th St., Oakland, Calif.	Sept. 30, 1933
W GULLANS, OSCAR. Senior Chemist, Experimental Filtration Plant, 8748 Indiana Ave., Chicago, Ill.	May 17, 1933
GUNTER, HERMAN. State Geologist, P. O. Box 495, Tallahassee, Fla.	May 11, 1928
GUSHEE, EDWARD G. Asst. Engr., Bureau of Water, 5119 Greene St., Germantown, Philadelphia, Pa.	May 12, 1908
GUTTERIDGE, WESLEY W. Civil Engr., 8975 215th Place, Queens Village, L. I., N. Y.	Jan. 11, 1933
HAAS, S. G. FRANK. Technical Engr., Sewerage & Water Board, New Orleans, La.	Oct. 16, 1933
HACKER, A. C. Vice Pres., Hacker Pipe & Supply Co., 1725 E. Seventh St., Los Angeles, Calif.	Oct. 31, 1929
HAGINS, C. E. Asst. to Gen. Mgr., Water Dept., 314 Luzerne St., Westmont, Johnstown, Pa.	Sept. 7, 1926
W HALE, FRANK E. Director of Laboratories, Mt. Prospect Laboratory, Dept. of Water Supply, Gas & Electricity of New York City, 421 Flatbush Ave., Brooklyn, N. Y.	May 12, 1908
HALEY, F. W. Asst. Engr., With F. A. Barbour, Cons. Engr., 1119 Tremont Bldg., Boston, Mass.	Oct. 31, 1929
HALL, H. F. Chief Engr., Water Works Dept., Northern Apartments, Sarnia, Ont., Canada.	June 21, 1920
AP HALL, H. G. Supt., Public Utilities Commission, Ingersol, Ont., Canada.	Mar. 26, 1923
APW HALL, HARRY R. Deputy Chief Engr., Washington Suburban Sanitary District, Hyattsville, Md.	May 8, 1915
P HALL, L. STANDISH. Chief Hydrographer, East Bay Municipal Utility District, 512—16th St., Oakland, Calif.	July 13, 1933
PW HALL, ROLAND B. Burford, Hall & Smith, Contractors, 705 Myrtle St., N. E., Atlanta, Ga.	Sept. 22, 1925
PW HALL, W. H. Prof. of Civil Engineering, College Station, Durham, N. C.	Jan. 11, 1930

		Joined
	PW HALLAM, G. E. Water Supt., P. O. Box 204, Orofino, Ida.....	June 29, 1933
23, 1920	HALLGREN, E. N. Dist. Mgr., Rensselaer Valve Co., 503 Arctic Bldg., Seattle, Wash.....	Dec. 30, 1929
2, 1920	HALLGREN, R. A. Water Works Supt., Crystal Beach, Ont., Canada.....	Apr. 16, 1934
31, 1930	HALPIN, HENRY E. Fire Protection Engr., Inspection Dept., Associated Factory Mutual Fire Insurance Cos., 184 High St., Boston, Mass.....	Jan. 11, 1930
12, 1929	AW HALPIN, THOMAS F. A. P. Smith Mfg. Co., East Orange, N. J.	July 18, 1901
31, 1933	P HAM, GEORGE C. Sect. & Gen. Mgr., Naugatuck Water Co., 250 Meadow St., Naugatuck, Conn.....	May 10, 1930
17, 1920	P HAMILTON, JOHN. 5838 N. Albina Ave., Portland, Ore.....	Nov. 19, 1929
11, 1921	W HAMMOND, W. H. Supt., Lindsay Water Works, Lindsay, Ont., Canada.....	June 24, 1914
31, 1924	PW HANCOCK, C. V. Asst. Engr., City Hall, Decatur, Ga.....	May 28, 1931
29, 1923	W HANCOCK, EDWIN. Cons. Munic. Engr., 1509 Jackson Blvd., Chicago, Ill.....	Nov. 12, 1919
7, 1934	PW HANEY, W. R. Mgr., Ashland Div., Wisconsin Hydro Electric Co., 220 E. Second St., Ashland, Wis.....	Nov. 27, 1933
28, 1933	APW HANKS, C. W. Supt., Water Works Construction, 1720 California St., Denver, Colo.....	Aug. 24, 1933
15, 1930	AP HANNA, DAVID McLEAN. Service Supt., City Hall, Windsor, Ont., Canada.....	June 9, 1920
5, 1921	HANNA, R. B. Supt., Public Utilities Commission, Listowel, Ont., Canada.....	Apr. 10, 1931
30, 1933	W HANNAN, FRANK. Chemist, Filtration Plant, 285 Willow Ave., Toronto, 8, Ont., Canada.....	July 30, 1921
7, 1933	HANNAN, JAMES, JR. Vice Pres. & Mgr., Chas. H. Sells, Inc., 15 Washington Ave., Pleasantville, N. Y.....	June 10, 1930
1, 1928	PW HANSELL, WM. A. Asst. Chief of Construction, City Hall, Atlanta, Ga.....	Oct. 25, 1933
2, 1908	W HANSEN, A. E. Hyd. & San. Engr., 1350 Broadway, New York, N. Y.....	Dec. 31, 1917
4, 1933	HANSEN, J. C. Water Works Trustee, 551 W. Broadway, Council Bluffs, Iowa.....	Feb. 27, 1924
3, 1933	APW HANSEN, PAUL. Greeley & Hansen, Cons. Engrs., 6 N. Michigan Ave., Chicago, Ill.....	June 4, 1912
1, 1929	PW HARDIN, EUGENE A. Engineering Div., Detroit Dept. of Water Supply, 8100 W. Warren Ave., East Dearborn, Mich.....	Nov. 10, 1925
7, 1926	W HARDING, JAMES C., JR. Cons. Engr., 11 Park Place, New York, N. Y.....	June 6, 1922
4, 1908	P HARGETT, ALBERT E. Dist. Mgr., Delaware Valley Utilities Co., 5 Morgan Ave., Palmyra, N. J.....	Mar. 25, 1929
1929	A HARMAN, W. B. Auditor, Newport News Waterworks Commission, Newport News, Va.....	July 17, 1934
1920	PW HARMON, BURT. Hyd. Engr., Water Dept., 308 Public Utilities Bldg., Long Beach, Calif.....	Oct. 21, 1932
1923	P HARMONAY, MICHAEL J. Supt., Bureau of Water, City Hall, Yonkers, N. Y.....	Aug. 16, 1932
1915	HARNISH, C. P. Chief Engr., American States Water Service Co., 950 Bendix Bldg., 1206 S. Maple Ave., Los Angeles, Calif.....	Aug. 8, 1929
1933	HARRELL, J. W. Supt., Roanoke Rapids Sanitary District, Roanoke Rapids, N. C.....	Jan. 11, 1930
1925	PW HARRIS, HOWARD A. Asst. Engr., California Water Service Co., 501 Federal Reserve Bldg., San Francisco, Calif.....	Aug. 15, 1927
1900	HARRIS, JOHN P. 205 W. Wacker Drive, Suite 1306, Chicago, Ill.....	Oct. 27, 1933

	Joined
APW HARRIS, R. C. Commissioner of Works, City Hall, Toronto, Ont., Canada.....	May 12, 1914
PW HARRISON, LOUIS B. Supt. of Filtration, Water Works Dept., Bay City, Mich.....	Feb. 28, 1931
APW HARRISON, RONALD, B.A.Sc. Engr. & Supt., Scarboro Township Water Works, Birch Cliff P. O., Toronto, Ont., Canada.....	Jan. 30, 1924
PW HARRUB, C. NELSON. C. N. Harrub Engineering Co., Civil & San. Engrs., 705 Fourth & First National Bank Bldg., Nashville, Tenn.....	Apr. 16, 1914
HARSHBARGER, ELMER D. Pres., Pitt Construction Co., 239 Gladstone Rd., Squirrel Hill Station, Pittsburgh, Pa....	June 28, 1924
HARTMANN, F. W. National Meter Co., 1455 W. Congress St., Chicago, Ill.....	July 20, 1925
PW HASBROUCK, PHILIP B. Engr., Fontana Domestic Water Co., Box 294, Fontana, Calif.....	May 20, 1930
P HASKEW, GEORGE M., C.E. Supt., Plainfield-Union Water Co., 107 W. Broad St., Westfield, N. J.....	July 10, 1929
W HASKINS, CHAS. A. Cons. Engr., 822 Finance Bldg., Kansas City, Mo.....	June 19, 1914
W HATCH, ARAM H. Chief Chemist, Water Purification Plants of Canal Zone, P. O. Box 283, Ancon, C. Z.....	Aug. 20, 1927
PW HATFIELD, WILLIAM D. Sewage Disposal Plant, Sanitary District of Decatur, Decatur, Ill.....	Jan. 31, 1917
HAUCK, WILLIAM. Borough Engr., Dept. of Water Supply, Bergen Bldg., Bronx, New York, N. Y.....	May 15, 1930
HAUPT, B. W. Sect., Roaring Creek & Bear Gap Water Cos., 204 Sunbury St., E., Shamokin, Pa.....	Mar. 16, 1922
APW HAUSMANN, A. R. Asst. Pacific Coast Mgr., United States Pipe & Foundry Co., 681 Market St., San Francisco, Calif.....	Aug. 28, 1933
AW HAVENS, WILLIAM L. Associate, Geo. B. Gascoigne, 1149 Leader Bldg., Cleveland, O.....	June 5, 1926
HAVILL, HAROLD T. Asst. Engr., Dept. of Water Supply of New York City, Box 323, Valhalla, N. Y.....	June 11, 1902
W HAWLEY, GEO. W. Deputy State Engr. in Charge of Supervision of Dams, 1100 N. St., Sacramento, Calif.....	June 30, 1922
APW HAWLEY, JOHN B. Cons. Engr., 407 Capps Bldg., Fort Worth, Tex.....	June 1, 1923
AP HAWLEY, W. C. Chief Engr. & Gen. Supt., Pennsylvania Water Co., 712 South Ave., Wilkinsburg, Pa.....	Apr. 27, 1910
W HAYDOCK, CHARLES. Cons. Engr., 2726 W. Somerset St., Philadelphia, Pa.....	Feb. 17, 1919
APW HAYES, C. T. Chief, Bureau of Water, 802 City Hall Annex, Philadelphia, Pa.....	Apr. 28, 1930
PW HAYES, H. W. Supt. of Water Works, Lawrenceville, Va.....	July 21, 1934
PW HAYES, HARRY. Junior Civil Engr., Field Engineering Investigations, Dept. of Water & Power, Box 240, Arcade Annex, Los Angeles, Calif.....	Feb. 20, 1933
PW HAYES, MORGAN D. City Engr., 52 City Hall, Rochester, N. Y.....	Apr. 30, 1930
W HAZLEHURST, GEORGE H. Director, Bureau of Sanitation, State Dept. of Public Health, Montgomery, Ala.....	Nov. 1, 1914
HEARD, ALBERT. Supt. & Sect., Water Dept., Hagerstown, Md.....	July 18, 1907
W HEATH, RAYMOND F. Chief Chemist, Dept. of Public Health, City Hall, Toronto, 2, Ont., Canada.....	June 26, 1924
AP HEBBRING, A. W. Supt., Water Works, 8434 Kenyon Ave., Wauwatosa, Wis.....	Sept. 8, 1923

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Joined

12, 1914

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PW HECHMER, CARL A. Dept. Engr., Maintenance & Operating Dept., Washington Suburban Sanitary District, Hyattsville, Md.

Nov. 3, 1919

HEDDELL, DOUGLAS. Plant Construction Engr., Dept. of Water & Power, 5007 Los Robles St., Los Angeles, Calif.

Oct. 19, 1933

PW HEDGEPEETH, L. L. Mgr., Technical Service Dept., Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia, Pa.

Aug. 13, 1929

HEDMAN, O. F. Salesman, Hughes & Co., Box 193, Spokane, Wash.

June 30, 1934

HEENEY, CARDEN T. Engr., 344 Fifth Ave., Ottawa, Ont., Canada.

Jan. 27, 1933

HEERMANS, H. C. Retired, 817 J. St., Hoquiam, Wash.

June 26, 1886

P HEFFERNAN, DAVID A. Supt., Water Dept., Milton, Mass.

May 28, 1924

APW HEINE, FRANCIS A. Engr., Bureau of Water, 25 N. Eleventh St., Reading, Pa.

June 12, 1931

W HELBIG, W. A. Chemist, Darco Sales Corp., 45 E. 42nd St., New York, N. Y.

Feb. 25, 1930

HELLING, HARRY A. 116 South Broadway, Tarrytown, N. Y.

Jan. 17, 1922

HELLSTROM, CARL I. Supt., Water & Light Dept., Geneva, Ill.

Mar. 20, 1933

W HELMREICH, L. W. Supt., Capital City Water Co., Box 32, Jefferson City, Mo.

Feb. 14, 1927

W HENDERSON, CHARLES R. Mgr., Davenport Water Co., 211 Brady St., Davenport, Iowa.

June 18, 1901

APW HENDERSON, JOHN M. Asst. State Dir. of Malaria Control, U. S. Public Health Service, Box 266, Vidalia, Ga.

Jan. 22, 1931

HENDRICK, WALLACE M. Contractor & Engr., 457 Franklin Ave., Mineola, L. I., N. Y.

May 10, 1915

W HENDRICKS, R. W. Engr., Hydraulic Dept., Underwriters Laboratories, 207 E. Ohio St., Chicago, Ill.

Apr. 2, 1923

PW HENDRICKSON, GEO. L. Asst. Managing Engr., Bureau of Water, City County Bldg., Pittsburgh, Pa.

Mar. 19, 1931

AP HENRY, J. REX. Dept. of Utilities, 734 N. Park Ave., Fremont, Nebr.

Aug. 26, 1932

APW HENSHAW, FRANKLIN. Mgr., Water Dept., Scarsdale, N. Y.

Sept. 21, 1920

PW HERR, J. O. Mgr., Monmouth Consolidated Water Co., Long Branch, N. J.

June 5, 1916

APW HERRING, FRANK W. Asst. Editor. "Engineering News-Record," 330 W. 42nd St., New York, N. Y.

Jan. 6, 1930

HETZER, MENTOR. Moundsville Water Co., 506 Seventh St., Moundsville, W. Va.

Nov. 17, 1916

W HEUBI, THOMAS B. Supt. of Water Works, 45 Washington Ave., Fredonia, N. Y.

Apr. 28, 1930

HEWETT, ARTHUR L. Supt., Water Dept., 109 N. 27th St., Billings, Mont.

Mar. 19, 1932

HEYWARD, T. C., B.S. Mech. & Elec. Engr., 1100 Realty Bldg., Charlotte, N. C.

June 22, 1923

PW HIBBS, A. S. Supt., Dept. of Water Works, 140 City Hall, Cincinnati, O.

Sept. 12, 1922

HIBSCHMAN, CHARLES A. Supt., Ambler Spring Water Co., Ambler, Montgomery Co., Pa.

Aug. 11, 1924

PW HICKLIN, ROBERT G. Mgr., Municipal Dept., Robert & Co., Inc., 706 Bona-Allen Bldg., Atlanta, Ga.

Apr. 29, 1929

PW HICKOX, J. R. Hyd. Engr., Chicago, Burlington & Quincy R. R., Room 1501, Burlington Bldg., 547 W. Jackson Blvd., Chicago, Ill.

June 17, 1926

PW HIGHLAND, SCOTLAND G. Sect., Treas. & Gen. Mgr., Clarksburg Water Board, Clarksburg, W. Va.

Feb. 10, 1913

HILL, ALFRED H. Vice Pres., Francis Hankin & Co., Ltd., 2028 Union Ave., Montreal, Que., Canada.

Feb. 28, 1933

HILL, JOHN R. Water Supt., 409 Lewis St., Moscow, Ida.

July 11, 1934

	Joined
W HILL, NICHOLAS S., JR. Consulting Engineer, 112 E. 19th St., New York, N. Y.	June 18, 1901
APW HILL, RAYMOND A. Cons. Civil Engr., Engineers Consolidated, 712 Standard Oil Bldg., Los Angeles, Calif.	Feb. 29, 1932
HINDS, JULIAN. Asst. Chief Engr., Metropolitan Water District, 306 W. Third St., Los Angeles, Calif.	May 9, 1931
APW HINMAN, JACK J., JR. Assoc. Prof. of Sanitation, University of Iowa, P. O. Box 363, Iowa City, Iowa.	Apr. 21, 1915
APW HINTZ, ALBERT E., JR. Sect., Water Dept., City Hall, Room 8, Oshkosh, Wis.	Apr. 16, 1930
P HITCHMAN, ARTHUR. Asst. Supt., Water Distribution Section, Dept. of Works, 33 Hillsdale Ave., West, Toronto, Ont., Canada.	Sept. 30, 1928
PW Hoad, WILLIAM C. Prof. of San. & Munic. Engineering, University of Michigan, Ann Arbor, Mich.	June 24, 1913
HOAG, GEO. F. Engr., Suburban Division, New York Fire Insurance Rating Organization, 85 John St., New York N. Y.	June 2, 1920
HOCHLERNER, TOBIAS. Asst. Engr., Dept. of Water Supply, Gas & Electricity, Municipal Bldg., Room 2534, New York, N. Y.	May 31, 1930
HODGMAN, BURT B., C.E. National Water Main Cleaning Co., 50 Church St., New York, N. Y.	July 18, 1907
HODKINSON, THOMAS. Supt. of Water Works, 382 Wortley Road, London, Ont., Canada.	Apr. 15, 1913
HOFFER, H. A. Eastern Sales Mgr., United States Pipe & Foundry Co., 1624-30 Lincoln-Liberty Bldg., Broad & Chestnut Sts., Philadelphia, Pa.	May 20, 1930
HOFFMAN, F. A. Supt., Water District, Maplewood, Ore.	July 1, 1934
PW HOFFMAN, FLOYD A. Supt. of Water Dept., Box 413, Morristown, N. J.	July 12, 1926
HOLDEN, H. H. Mgr., Palos Verdes Water Co., Palos Verdes Estates, Calif.	Nov. 24, 1930
HOLDREDGE, L. I. The Duro Co., 50 Church St., New York, N. Y.	Jan. 1, 1926
W HOLDREDGE, NEIL C. Deputy Chief Engr., North Jersey District Water Supply Commission, Pompton Plains, N. J.	May 26, 1924
AP HOLLAND, PAUL L. Chief Engr., Public Service Commission of Maryland, 1701 Munsey Bldg., Baltimore, Md.	Mar. 31, 1932
HOLLANDER, HARRY. Asst. Engr., Dept. of Water Supply, Gas & Electricity, 2532 Municipal Bldg., New York, N. Y.	May 26, 1930
PW HOLLETT, A. R. Instructor in Civil Engineering, University of North Carolina, Box 281, Chapel Hill, N. C.	Dec. 11, 1931
HOLMAN, E. T. Chief Inspector, Tennessee Inspection Bureau, 1034 Stahlman Bldg., Nashville, Tenn.	Jan. 7, 1924
W HOLMES, JOSEPH A. Director of Service, National Aluminate Corp., 6216 W. 66th Place, Chicago, Ill.	May 25, 1926
W HOLMQUIST, C. A. Director, Division of Sanitation, State Dept. of Health, State Office Bldg., Albany, N. Y.	Apr. 27, 1923
HOLSTE, ALEXANDER. Drateln & Holste Suer., 2a V. Caranza 48, P. O. Box 438, Mexico City, Mexico.	May 21, 1934
APW HOLTON, DOUGLAS W. Supt., Water Dept., Washington, D. C.	May 31, 1930
HOLWAY, W. R. Cons. Hyd. Engr., 302 E. 18th St., Tulsa, Okla.	Feb. 18, 1925
PW HOLY, WILLIAM E. Mgr., Madison Water Works Co., Madison, W. Va.	July 18, 1934
W HOMMON, HARRY B. Dist. Engr., U. S. Public Health Service, 14th Ave. & Lake St., San Francisco, Calif.	July 27, 1921

		Joined
18, 1901	W HOOKER, ALBERT H., JR. Hooker Electrochemical Co., Tacoma, Wash.	July 14, 1930
29, 1932	PW HOOKER, L. J. Supt. of Water Works, City Bldg., Pine St., Lockport, N. Y.	Mar. 19, 1931
9, 1931	W HOOVER, CHARLES P. Chemist, Filtration Plant, Columbus, O.	May 14, 1913
21, 1915	W HOPKINS, CHARLES C. Hyd. & San. Engr., 349 Cutler Bldg., Rochester, N. Y.	June 10, 1911
16, 1930	PW HOPKINS, EDWARD S. Prin. San. Chemist, Montebello Filters, Baltimore, Md.	June 13, 1921
30, 1929	APW HOPKINS, EDWIN W. Consolidated Water Co., 712 Washington St., Utica, N. Y.	Aug. 13, 1925
24, 1913	APW HOPKINS, FRANKLYN C. Post Office Drawer 532, Utica, N. Y.	June 16, 1919
2, 1920	P HOPPER, WALTER C. Supt., Passaic District, Passaic Valley Water Commission, 145 Prospect St., Passaic, N. J.	June 10, 1911
1, 1930	P HORAN, JOHN J. Supt., Delaware River Water Co., Beverly, N. J.	Jan. 21, 1930
8, 1907	HORANDT, HENRY. Meter Engr., New York Water Service Corp., 2015 Church Ave., Brooklyn, N. Y.	June 24, 1929
5, 1913	HORIE, KATSUMI. Director, Water Works Bureau, Yamashita-Cho, Yokohama, Japan.	July 31, 1930
0, 1930	A HORNE, RALPH W. Fay, Spofford & Thorndike, 44 School St., Boston, Mass.	May 26, 1928
1, 1934	HORNER, CHARLES M. Supt., Water Works Co., 1705 State St., East St. Louis, Ill.	June 24, 1903
2, 1926	W HORSTMANN, F. B. Chem. Engr., 1005 N. Leamington Ave., Chicago, Ill.	June 15, 1927
1, 1930	HORTON, ROBERT E., H.E. R. D. No. 1, Voorheesville, N. Y.	Jan. 20, 1911
2, 1926	W HORTON, THEODORE. Chief San. Engr., State Dept. of Engineering, 352 State St., Albany, N. Y.	July 18, 1907
1, 1930	HOSEY, WM. J. Mayor of City of Fort Wayne, Room 3, City Hall, Fort Wayne, Ind.	Feb. 19, 1930
1, 1926	PW HOSKINSON, CARL M. 1140-43rd St., Sacramento, Calif.	June 29, 1928
1924	HOSTETLER, ERVIN W. Supt. of Distribution, Iowa City, Iowa	June 6, 1927
1932	HOSTRUP, C. F. Dist. Mgr., The Pitometer Co., 501 Howard St., San Francisco, Calif.	Feb. 15, 1930
1932	PW HOUGH, LAURENCE C. The Pitometer Co., 1403 State Bank Bldg., Albany, N. Y.	Jan. 17, 1919
1930	W HOUSER, GEORGE C. 441 Washington St., Brookline, Mass.	Nov. 24, 1925
1931	W HOWARD, CHARLES D. Chemist, State Board of Health, Concord, N. H.	Feb. 18, 1921
1924	PW HOWARD, JOHN L. Deputy Chief Engr., Water Div., Metropolitan District Commission, 20 Somerset St., Boston, Mass.	May 31, 1924
1926	PW HOWARD, N. J. Director of Water Purification, Island Filtration Laboratories, 410 Lake Shore, Centre Island, Toronto, Ont., Canada.	June 21, 1920
1923	HOWE, B. V. San. Engr., San. Engineering Div., State Board of Health, State Office Bldg., Denver, Colo.	Apr. 30, 1930
1934	W HOWES, D. W. Civil Engr., 248 Park St., Newton, Mass.	Apr. 16, 1930
1930	HOWLAND, E. ROBERT. The British Pitometer Co., Victoria Station House, London, S. W. 1, England.	Apr. 22, 1914
1925	W HOWLAND, J. HASTINGS. Engr., National Board of Fire Underwriters, 85 John St., New York, N. Y.	May 15, 1924
1934	HOWLAND, WARREN E. Asst. Prof. of Civil Engineering, School of Civil Engineering, Purdue University, West Lafayette, Ind.	Apr. 9, 1934
1921	W HOWSON, LOUIS R. Alvord, Burdick & Howson, Cons. Engrs., 1401 Civic Opera Bldg., Chicago, Ill.	Apr. 24, 1916

	Joined
W HOY, J. R. San. Engr., 404 Hildebrandt Bldg., Jacksonville, Fla.....	Feb. 15, 1930
HOY, JOSEPH A. Supervising Foreman, Water Dept., 18 E. Worcester St., Worcester, Mass.....	May 15, 1922
HUBBARD, EDWARD. Civil Engr., Dept. of Water & Power, 207 South Broadway, Los Angeles, Calif.....	Jan. 27, 1933
APW HUBER, GEO. Supt., Dept. of Water Works & Sewers, City Bldg., Parkersburg, W. Va.....	Apr. 16, 1930
HUDSON, F. W. National Iron Corp., Ltd., Toronto, Ont., Canada.....	Feb. 25, 1932
W HUDSON, H. E., Jr. Junior San. Engr., Experimental Filtration Plant, 6843 Oglesby Ave., Chicago, Ill.....	May 25, 1933
HUFFMAN, BENJAMIN F. Mgr., Rockport Water Works, 219 Main St., Rockport, Ind.....	May 17, 1929
P HUFFMAN, H. H. Supt., Water & Street Lighting Dept., Topeka, Kans.....	June 14, 1932
P HUGGANS, R. D. Mgr., Water Works, Streator, Ill.....	Apr. 19, 1915
APW HUGHES, W. P. City Engr. & Water Supt., City Hall, Lewiston, Ida.....	Sept. 18, 1925
W HULBERT, ROBERTS. Senior Chemist, Filtration Plant, Water Works Park, Detroit, Mich.....	Apr. 17, 1930
HUNT, WM. G. Pump House Residence, R. R. No. 4, Peterborough, Ont., Canada.....	Apr. 29, 1924
W HUNTER, CHARLES A. Asst. Director, State Health Laboratory, Vermillion, S. D.....	July 18, 1923
HUNTER, G. A. Supt. of General Construction, East Bay Municipal Utility District, 512-16th St., Oakland, Calif.....	May 23, 1933
W HUNTER, T. B. Cons. Engr., 41 Sutter St., San Francisco, Calif.....	July 10, 1906
W HURD, CHARLES H. Cons. Engr., 1041 Architects & Builders Bldg., 333 N. Pennsylvania St., Indianapolis, Ind.....	Aug. 11, 1914
PW HURLBUT, WILLIAM W. Water Distribution Engr. Dept. of Water & Power, 207 So. Broadway, Los Angeles, Calif.....	May 28, 1924
PW HURST, WM. D., C.E. Asst. Engr., City of Winnipeg, 223 James Ave., Winnipeg, Man., Canada.....	Apr. 25, 1934
APW HUSE, GEORGE A. Treas. & Mgr., Kankakee Water Co., 132 So. Dearborn Ave., Kankakee, Ill.....	June 6, 1927
HUTCHESON, C. E. Supt., Light & Water Dept., East Point, Ga.....	Apr. 22, 1929
PW HUTCHINS, WILL A. Sect. & Supt., Water Co., 196 Van Buren St., Freeport, Ill.....	Nov. 30, 1920
HUTCHINSON, M. C. Managing Director, Victaulic Co. of Canada, Ltd., 200 Bay St., Toronto, Ont., Canada.....	Jan. 27, 1933
PW HUTCHISON, ALEXANDER, C.E. Director, Drummond, McCall & Co., P. O. Box 660, Montreal, Que., Canada.....	May 5, 1921
W HUTTON, HAROLD S. San. Engr., Wallace & Tiernan Co., Inc., Box 178, Newark, N. J.....	Apr. 1, 1920
W HYDE, CHARLES G. Cons. Hyd. & San. Engr., Prof. of San. Engineering, University of California, Berkeley, Calif...	July 18, 1907
HYDE, RALPH H. Vice Pres. & Gen. Mgr., Campbell Water Co., Box 1, Campbell, Calif.....	May 17, 1927
P HYMAN, H. H. Mgr., Miami Water Co., Miami, Fla.....	Apr. 16, 1916
IMBEAUX, DR. EDOUARD. Ingenieur des Ponts et Chaussees, 18, Rue Emile-Galle, Nancy, France.....	May 31, 1930
PW IMBT, WILLIAM C. Asst. Geologist, 305 Ceramics Bldg., Urbana, Ill.....	July 13, 1933
PW INMAN, C. E. Supt., Commissioner & Supt., Water Works, Warren, O.....	May 24, 1921
IRELAND, D. W. Filter Plant Operator, Elon College, N. C....	Jan. 11, 1930

Joined

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Nov. 6, 1933

May 12, 1908

Jan. 9, 1923

Mar. 31, 1930

Aug. 18, 1920

Jan. 31, 1910

Aug. 7, 1924

July 30, 1920

Sept. 17, 1930

Feb. 5, 1919

Apr. 5, 1932

May 9, 1931

Sept. 8, 1931

Oct. 11, 1921

June 6, 1927

May 5, 1914

Oct. 14, 1922

Feb. 9, 1925

Jan. 26, 1917

Apr. 15, 1910

June 3, 1912

Jan. 1, 1934

May 25, 1926

May 12, 1925

Apr. 12, 1934

June 6, 1934

Nov. 10, 1927

Oct. 19, 1932

May 18, 1934

APW IRWIN, GIFFORD M. City Engr., City Hall, Victoria, B. C., Canada

ISAAC, F. N. Sect. & Gen. Mgr., Hanford Water Co., Hanford, Calif.

PW IWASAKI, TOMIHISA. Water Works Dept., Suidokyoku, Tokyo-Shiyakusho, Japan

JACK, GRANT R. Commissioner of Works, Township of East York, 443 Sammon Ave., Toronto 6, Ont., Canada

JACKSON, C. B. California Water Service Co., 365 B St., San Mateo, Calif.

PW JACKSON, DANIEL D. San. Engr., Havemeyer Hall, Columbia University, New York, N. Y.

W JACKSON, H. W. Supt. of Water Works, 912 Arctic St., Antigo, Wis.

W JACOBS, JOSEPH. Cons. Civil Engr., 613-16 Thomson Bldg., Seattle, Wash.

APW JACOBS, NATHAN B. Vice Pres., Morris Knowles, Inc., 507 Westinghouse Bldg., Pittsburgh, Pa.

JACOBS, S. WILLARD. Chem. Engr., 9 E. 41st St., New York, N. Y.

P JACOBSON, E. E. Chief Engr., Lexington Water Co., 167 N. Upper St., Lexington, Ky.

JACOBS, GEORGE T. Vice Pres., Alco Products, Incorporated, 220 E. 42nd St., New York, N. Y.

JACQUES, HENRY L. Construction Engr., Dept. of Water & Power, 207 S. Broadway, Los Angeles, Calif.

PW JANZIG, ALEXANDER C. Water Bacteriologist & Chemist, Filtration Plant, 904-20th Ave., S. E., Minneapolis, Minn.

PW JARRETT, J. M. Box 56, La Fayette, Ga.

PW JARVIS, CAPT. ALEXANDER C. Water Purification Specialist, Jens Kofodsgade 4, Copenhagen, Denmark

W JENKINS, DAVID. New Jersey Zinc Co., Franklin, N. J.

PW JENKINS, E. J. Supt. of Distribution, Philadelphia Suburban Water Co., 762 Lancaster Ave., Bryn Mawr, Pa.

PW JENKS, HARRY N. Cons. San. Engr., 2701 Benvenue Ave., Berkeley, Calif.

W JENSEN, J. ARTHUR. Supervisor, Water Works Dept., Minneapolis, Minn.

PW JENSEN, J. CHRIS. Municipal Water Works, Council Bluffs, Iowa

JESSUP, B. L. State Board of Health, Raleigh, N. C.

JETTE, JOS. A. Engr. Supt., Montreal Water Works, 3302 Adam St., Montreal, Que., Canada

W JEUP, BERNARD H. Director, San. Engineering Labs., State Division of Public Health, 201 State House Annex, Indianapolis, Ind.

PW JEWELL, G. H. Dist. Mgr., Builders Iron Foundry, 122 S. Michigan Ave., Chicago, Ill.

JEWELL, IRA H. Water Purification Engr., 201 N. Clinton St., Chicago, Ill.

A JEWELL, WILLIAM V. Chief Bookkeeper, Dept. of Streets & Public Improvements, 630 Bergen Ave., Jersey City, N. J.

W JEWETT, HERBERT A. Chief Water & Sewage Inspector, Los Angeles County Health Dept., 678 S. Ferris Ave., Los Angeles, Calif.

P JOHNSON, CLAYTON O. Supt., Board of Public Utilities, Jamestown, N. Y.

	Joined
JOHNSON, CURTIS H. Supt., Oregon Washington Water Service Co., 304 S. Commercial St., Salem, Ore.....	May 22, 1934
JOHNSON, EDGAR W. Asst. Engr., Water Dept., R. F. D. No. 8, Fridley, Minn.....	July 13, 1917
APW JOHNSON, HOWARD A. 141 Howeland Circle, Danville, Va.....	Nov. 7, 1928
P JOHNSON, JESS B. Supt. of Utilities, Sturgeon Bay, Wis.....	Nov. 25, 1931
JOHNSON, L. E. Engr., Box 1404, Wilson, N. C.....	Dec. 21, 1933
JOHNSON, R. K. Dist. Sales Mgr., Darling Valve & Mfg. Co., 149 Broadway, New York, N. Y.....	Jan. 18, 1928
W JOHNSON, SAMUEL C. Chem. Engr., Dearborn Chemical Co., Straus Bldg., Room 1912, Chicago, Ill.....	Apr. 9, 1923
JOHNSON, W. H. Supt. of Water Works, Harrodsburg, Ky...	Feb. 20, 1931
W JOHNSON, W. SCOTT. City Health Dept., Municipal Courts Bldg., St. Louis, Mo.....	Feb. 16, 1924
PW JOHNSTON, E. W. Asst. San. Engr., San. Engineering Div., Ontario Dept. of Health, Parliament Bldgs., Toronto, Ont., Canada.....	Feb. 19, 1934
JONES, EARL F. Indiana Water Works Co., Greensburg, Ind.	Mar. 23, 1927
JONES, H. E. Brunner, Mond & Co., Ltd., Northwich, Cheshire, England.....	Feb. 6, 1928
PW JONES, H. SEAVER. Vice Pres., East Jersey Pipe Co., 7 Dey St., New York, N. Y.....	July 16, 1922
W JONES, HARVEY P. Cons. Engr., 1606 Second National Bank Bldg., Toledo, O.....	July 30, 1922
PW JONES, HIRAM F. Supt. of Pumping & Filtration, Elmira Water Board, Elmira, N. Y.....	July 18, 1907
P JONES, JAMES E. Asst. Engr., Dept. of Water & Power, Box 240, Arcade Annex, Los Angeles, Calif.....	Oct. 28, 1933
APW JONES, MAURICE L. Supt., Water Dept., 368 Washington St., Benton Harbor, Mich.....	May 8, 1920
PW JONES, MORRIS S. Asst. Chief Engr., Water Dept., City Hall, Pasadena, Calif.....	Oct. 28, 1924
JONES, W. B. Sect., James Jones Co., 201 Leroy St., Los Angeles, Calif.....	Oct. 31, 1931
W JONES, W. N. 15 Hamilton Heath, Tampa, Fla.....	Apr. 14, 1914
JORDAN, CHAS. F. Supt., Water Works, Columbus, Ga.....	Apr. 9, 1930
JORDAN, FRANK C. Sect., Indianapolis Water Co., 113 Monument Circle, Indianapolis, Ind.....	June 10, 1911
PW JORDAN, HARRY E. Chem. Engr., Indianapolis Water Co., 113 Monument Circle, Indianapolis, Ind.....	Oct. 7, 1919
PW JORDAN, WILLIAM H. Asst. Supt. of Grounds & Chief San. Patrolman, East Bay Municipal Utility District, 512-16th St., Oakland, Calif.....	May 23, 1933
P JOSLYN, RAY O. Mgr., Layne Western Co., B. M. A. Bldg., Kansas City, Mo.....	May 20, 1930
JUDGE, JAMES H. Dist. Mgr., Neptune Meter Co., 130 N. Jefferson St., Chicago, Ill.....	Apr. 23, 1934
P JUDSON, H. T. Portland Mgr., Hersey Mfg. Co., 475 Hoyt St., Portland, Ore.....	Mar. 25, 1929
APW JULIAN, JOHN. Water Div., Repair Sec., Dewey Ave. & Felix St., Rochester, N. Y.....	Sept. 9, 1932
JUTZ, CHARLES E. Treas., St. Louis County Water Co., 6600 Delmar Ave., St. Louis, Mo.....	Apr. 12, 1920
PW KABLE, EDGAR P. Gen. Mgr., York Water Co., 42 E. Market St., York, Pa.....	Nov. 10, 1917
W KAHN, JAMES M. Sales Engr., International Filter Co., 105 Rumson Road, Atlanta, Ga.....	Jan. 1, 1934
P KAISER, L. S. Supt., Bureau of Water, 321 City Hall, Portland, Ore.....	Feb. 25, 1930

		Joined
22, 1934	KAMPLAIN, A. C. 808 Lincolnway, Valparaiso, Ind.....	June 10, 1930
13, 1917	P KANZ, JOHN. Water Supt., Waitsburg, Wash.....	July 6, 1934
7, 1928	APW KAPPE, STANLEY E. Asst. Engr., State Dept. of Health, Bureau of Engineering, 303 Keystone Bldg., Broad & Vine Sts., Philadelphia, Pa.....	Apr. 4, 1932
25, 1931	KEATING, CHARLES S. Cons. Engr., Room 419, City Hall, Syracuse, N. Y.....	May 16, 1919
21, 1933	PW KEEFER, GEORGE M. Rensselaer Valve Co., 1401 Oliver Bldg., Pittsburgh, Pa.....	Oct. 13, 1931
18, 1928	APW KEENAN, F. E. Supt. of Water Works, Gunnison, Colo.....	Oct. 31, 1929
9, 1923	KEENE, R. W. Pacific Coast Mgr., Hersey Mfg. Co., 450 E. Third St., Los Angeles, Calif.....	Feb. 14, 1927
20, 1931	W KEILS, ANTHONY. Supt., Mt. Clemens Water Works, 38 Moross Ave., Mt. Clemens, Mich.....	June 8, 1909
16, 1924	KEILY, C. J. Supt. & Treas., Jamaica Water Supply Co., 16120 —89th Ave., Jamaica, L. I., N. Y.....	Nov. 27, 1929
9, 1934	W KEIS, F. J. Cons. Engr., 257 Broadway, Troy, N. Y.....	Apr. 23, 1927
3, 1927	APW KEITH, J. CLARK. Chief Engr., Essex Border Utilities Com- mission, Canada Bldg., Windsor, Ont., Canada.....	Mar. 21, 1923
6, 1928	KELIHER, TIMOTHY. Supt., Williamsport Water Co., Wil- liamsport, Pa.....	Feb. 15, 1917
3, 1922	KELLER, GEORGE J. Sect. & Gen. Mgr., Iowa City Water Co., Iowa City, Iowa.....	Nov. 15, 1914
0, 1922	P KELLEY, C. H. Supt., Wichita Water Co., 301 N. Main St., Wichita, Kans.....	July 5, 1924
3, 1907	P KELLNER, HUGH. Chief Engr., City Water Works, 74 Moy Ave., Windsor, Ont., Canada.....	Feb. 28, 1923
1, 1933	W KELLOGG, JAMES W. Bacteriologist & Chemist, State Lab- oratory of Hygiene, Raleigh, N. C.....	June 10, 1921
1, 1920	P KELLOGG, L. P. Mgr., 'Triple-A' Protective Coatings Dept., Quigley Co., Inc., 56 W. 45th St., New York, N. Y.....	Feb. 14, 1934
1, 1924	PW KELSO, GILBERT L. 417 Chestnut St., Greensburg, Pa.....	May 10, 1930
1931	AW KEMPKEY, AUGUSTUS. Cons. Engr., 416 Hobart Bldg., San Francisco, Calif.....	June 10, 1923
1914	APW KENDALL, THEODORE R. Engineering Editor, "American City," 470 Fourth Ave., New York, N. Y.....	Mar. 13, 1919
1930	W KENNEDY, C. C. Civil Engr., 543 Call Bldg., San Francisco, Calif.....	Oct. 10, 1927
1911	APW KENNEDY, ROBERT C. Chief Designing Engr., East Bay Municipal Utility District, 512—16th St., Oakland, Calif.....	May 23, 1933
1919	PW KENNON, JAMES H. Managing Engr., Bureau of Water, 416 City-County Bldg., Pittsburgh, Pa.....	Sept. 30, 1929
1933	KEOGH, WM. J. Asst. Engr., Dept. of Water, 9350—209th St., Queens, N. Y.....	June 13, 1922
1930	PW KEPNER, DANA E. Mgr., Denver Office, Pacific States Cast Iron Pipe Co., 1925 Blake St., Denver, Colo.....	Oct. 31, 1925
1934	PW KER, MERLE F. Engr., Township of Stamford, Niagara Falls, Ont., Canada.....	Jan. 1, 1934
1929	KERLIN, E. M. Sullivan, Ind.....	May 12, 1925
1932	KERSLAKE, JAMES E. Chemist & Bacteriologist, With Nicho- las S. Hill, Jr., Cons. Engr., 112 E. 19th St., New York, N. Y.....	May 26, 1930
1920	APW KETCHAM, VALENTINE O. Gen. Mgr., Stamford Water Co., 51 Summer St., Stamford, Conn.....	July 6, 1926
1917	W KIENLE, JOHN A. Vice Pres., Mathieson Alkali Works, Inc., 250 Park Ave., New York, N. Y.....	June 8, 1909
1934	W KIKER, JOHN E., JR. Layne-New York Co., 92 Liberty St., New York, N. Y.....	May 23, 1933
1930	KILLAM, ELSON T. Designing Engr., With Alexander Pot- ter, Cons. Engr., 50 Church St., New York, N. Y.....	Dec. 22, 1931

	Joined
APW KILLAM, SAMUEL E. Supt., Distribution Section, Water Division, 20 Somerset St., Boston, Mass.	Nov. 25, 1915
KILLEBREW, A. R. Supt., Water Works, Box 22, Blakely, Ga.	June 12, 1929
KILLIAN, PAUL. Supt., Peoples Water Service Co., Brunswick, Ga.	Mar. 27, 1930
KIMBALL, JOHN H. Acct.-Sect., East Bay Municipal Utility District, 512-16th St., Oakland, Calif.	May 23, 1933
W KIMBALL, W. P. Instructor in Civil Engineering, Thayer School of Civil Engineering, Dartmouth College, Hanover, N. H.	Jan. 15, 1934
AP KINGMAN, HORACE. Commissioner & Supt., Water Dept., City Hall, Brockton, Mass.	Mar. 17, 1916
KINGSLEY, JOHN F. Chemist, 173 Lander St., Newburgh, N. Y.	Apr. 22, 1930
KINZER, A. L. Water Supt., Bellingham, Wash.	Apr. 16, 1934
W KIRCHOFFER, WILLIAM G. San. & Hyd. Engr., 22 N. Carroll St., Madison, Wis.	Jan. 31, 1923
PW KIRKPATRICK, WILLIAM. Supt., Filter Plants & Water Distribution, Water & Sewerage Board, Water Engr's Office, Cross Roads P. O., Jamaica, B. W. I.	July 1, 1934
PW KITCHEN, H. B. Mgr., Watsonville City Water Works, 268 Main St., Watsonville, Calif.	Feb. 16, 1924
KIVARI, A. M. Pacific Coast Mgr., The Dorr Co., 108 W. 6th St., Los Angeles, Calif.	Sept. 22, 1931
W KLAUS, FRED J. City Engr., 205 City Hall, Sacramento, Calif.	Oct. 2, 1915
KLEIN, WILLIAM I. Cons. Engr., 21 Maple Terrace, East Orange, N. J.	July 1, 1913
KLINGER, OLIVER C. Editor, Oildom Publishing Co., 1217 Hudson Boulevard, Bayonne, N. J.	Dec. 11, 1931
KNEEN, A. H. Scranton-Spring Brook Water Service Co., 135 Jefferson Ave., Scranton, Pa.	Jan. 8, 1911
KNICKERBACKER, JOHN, C. E. Pres., Eddy Valve Co., 86 First St., Troy, N. Y.	June 24, 1913
PW KNIESSEL, OBERINGENIEUR. Hansa-Ufer 1, Berlin, N.W. 87, Germany.	May 31, 1930
APW KNIGHT, CHARLES E. Civil Engr., 7310 Woodward Ave., Detroit, Mich.	Mar. 13, 1931
APW KNIGHT, G. WEBBER. Mgr., Natrona Water Co., Natrona, Pa.	Dec. 21, 1925
PW KNOWLES, CLARENCE R. Supt. of Water Service, Illinois Central R. R. Co., 6627 Woodlawn Ave., Chicago, Ill.	June 4, 1913
KNOWLES, CLARENCE W. City Engr., City Hall, Johnstown, N. Y.	May 20, 1930
APW KNOX, STUART K. Cons. Engr., 25 Warfield St., Montclair, N. J.	June 8, 1909
W KNOX, W. H. Asst. Engr., State Dept. of Health, Columbus, O.	Jan. 17, 1927
KOEBIG, ADOLPH H., JR. Cons. Engr., 821 Rowan Bldg., 458 S. Spring St., Los Angeles, Calif.	July 1, 1934
W KOON, RAY E. Stevens & Koon, Cons. Engrs., Spalding Bldg., Portland, Ore.	Feb. 11, 1922
APW KOPELMAN, THOMAS. Draughtsman, Municipal Water Dept., City Hall, Lewiston, Ida.	June 18, 1934
KOSTER, ROY F. 414 W. Adams St., Los Angeles, Calif.	Aug. 30, 1927
W KRAMER, WARREN A. Chem. Engr., Chain of Rocks Plant, St. Louis Water Dept., 34 E. Grand Ave., St. Louis, Mo.	Mar. 29, 1927
APW KRAUSE, JOHN W. Supt. of Water, Brookfield, Ill.	Mar. 11, 1932
KRIEGSHEIM, HEINRICH. 200 W. 86th St., New York, N. Y.	May 11, 1915
APW KUESTER, JOHN H. Supt., Water Works, 370 Naymut St., Menasha, Wis.	June 30, 1923
KUHNS, HAYES R. The Leadite Co., 274 E. 13th Ave., Columbus, O.	Sept. 9, 1930

Joined

	P KUNIGK, W. A. Supt., Water Div., 2903 N. 26th St., Tacoma, Wash.	Aug. 27, 1924
	P KUNKLE, CHARLES W. Supt., Johnstown Water Co., 244 Luzerne St., Johnstown, Pa.	June 11, 1924
	AP KURANZ, A. P. Supt., Water Dept., Waukesha, Wis.	Oct. 27, 1931
	KYDD, PAUL M. Sect., Jamaica Water Supply Co., 161-20 89th Ave., Jamaica, N. Y.	Dec. 22, 1931
	W LAASE, WILLIAM F. Asst. Engr., Dept. of Water Supply, Gas & Electricity, New York City, 142-26 32nd Ave., Flushing, N. Y.	May 28, 1924
	APW LABOON, JOHN F. Cons. Engr., 346 Bowerhill Road, Pittsburgh, Pa.	May 23, 1923
	W LABSAP, A. H. Water Supt., Longview, Wash.	Dec. 13, 1927
	LA DUE, WENDELL R. Chief Engr. & Acting Supt., Bureau of Water Supply, Municipal Bldg., Akron, O.	July 31, 1934
	LAFLIN, ALBERT A. Supt., Water Works, St. Stephen, N. B., Canada.	June 10, 1920
	PW LAFRENIERE, THEO. J. San. Engr., Board of Health of Prov. of Quebec, 59 Notre Dame, East, Montreal, Que., Canada.	June 24, 1916
	APW LAMBERT, CARL F. Burns & McDonnell Engineering Co., 107 W. Linwood Blvd., Kansas City, Mo.	Apr. 16, 1930
	LAMME, H. N. City Engr., City Hall, Salina, Kans.	Sept. 8, 1931
	LAMOND, A. W. Water Analyst, Alexandria Water Co., 4 Cedar St., Alexandria, Va.	Feb. 16, 1932
	LAMPLEY, J. H. Mgr., Board of Water Commissioners, Hendersonville, N. C.	Aug. 28, 1926
	PW LANE, D. ARNOLD. Asst. Engr., Los Angeles Dept. of Water & Power, 1349 Winchester Ave., Glendale, Calif.	Apr. 30, 1931
	LANE, FRED W. Water Works, 1132 Locust St., St. Petersburg, Fla.	Oct. 7, 1925
	PW LANG, FRANKLIN. Chemist, Feedwaters, Inc., 140 Cedar St., New York, N. Y.	Feb. 15, 1930
	LANG, O. H. Cons. Engr., Moultrie, Ga.	June 29, 1933
	W LANGEIER, WILFRED F. Assoc. Prof. of San. Engineering, University of California, Berkeley, Calif.	Feb. 28, 1923
	LARKINS, THOMAS H. Supt. of Filtration, 422 Vine St., East Liverpool, O.	May 20, 1929
	W LARMON, FRANK P. Chief Engr., West Virginia Water Service Co., 179 Summers St., Charleston, W. Va.	Apr. 17, 1914
	LASELL, FRED B. Chemist, Metropolitan Utilities District, 3023 Bondesson St., Omaha, Neb.	Jan. 25, 1934
	PW LASSITER, LEROY I. San. Engr., Consolidated Board of Health, Wilmington, N. C.	May 25, 1926
	LIASSO, ALFREDO F. Ing. Civ., Obras Sanitarias de la Nacion, Buenos Aires, Argentine.	Sept. 26, 1917
	W LATHROP, THOMAS R. Asst. San. Engr., State Dept. of Health, Columbus, O.	Jan. 10, 1925
	P LAUER, C. O. Pres. & Gen. Mgr., Gardiner Electric Light & Water Co., Gardiner, Mont.	July 13, 1931
	APW LAURENCENA, ING. ALBERTO F. 25 de Junio Street 262, Parana, Argentine.	Apr. 21, 1928
	PW LAUTER, CARL J. Chief Chemist, Washington Filtration Plants, Dalecarlia Filter Plant, Washington, D. C.	Apr. 13, 1922
	W LAUTZ, W. E. Sect. & Mgr., Pekin Water Works, Pekin, Ill.	Nov. 14, 1915
	PW LAVELLE, JOHN. Asst. Supt., Meters & Services, Dept. of Water & Power, Box 240, Arcade Annex, Los Angeles, Calif.	Oct. 29, 1932
	PW LAWLOR, FRANCIS D. H. Supt., Citizens Water Co., Burlington, Iowa.	July 10, 1906

	Joined
W LAWRENCE, FREDERICK H. 145 W. Sharpnack St., Germantown, Philadelphia, Pa.	Mar. 5, 1924
PW LAWRENCE, ROBERT L., JR. Supt. & Chief Engr., Water Works Dept., City Hall, Nashville, Tenn.	June 28, 1934
PW LAWRENCE, WILLARD C. Supt. of Filtration, Baldwin Filtration Plant, Fairmount Road, Cleveland, O.	June 17, 1926
LAWSON, J. G. Supt. of Water Works, Bethel, N. C.	Nov. 23, 1932
W LAWTON, RALPH W. Civil Engr., 137 North Van Ness Ave., Los Angeles, Calif.	July 10, 1906
PW LEA, WILLIAM S. Cons. Engr., 1226 University St., Montreal, Que., Canada	Jan. 26, 1924
LEACH, HARRY R. Hyd. Engr., Box 184, Slingerlands, N. Y.	Oct. 24, 1931
W LEAHY, HAROLD W. San. Bacteriologist & Chemist, School of Medicine & Dentistry, University of Rochester, Rochester, N. Y.	Aug. 9, 1932
W LEARNED, ALBERT P. Asst. Engr., Black & Veatch, Cons. Engrs., 701 Mutual Bldg., Kansas City, Mo.	May 15, 1922
LEBOLD, GEORGE. Supt. of Meters, Hackensack Water Co., 624 Park Ave., Weehawken, N. J.	Mar. 13, 1925
A LECHNER, BERNARD J. Sect. & Treas., Commissioners of Water Works, 701 French St., Erie, Pa.	July 31, 1929
PW LEDDEN, ERNEST M. Sect. & Gen. Mgr., Sea Cliff Water Co., 404 Fourth Ave., New York, N. Y.	Apr. 5, 1912
W LEE, CHARLES H. Cons. Hyd. Engr., 58 Sutter St., San Francisco, Calif.	Mar. 21, 1912
LEE, SCOTT M. Supt., City Water Dept., 58 Newman Ave., Arcadia, Calif.	June 6, 1927
W LEET, J. N. Supt., Water Dept., North East, Pa.	May 4, 1911
PW LEIPOLD, CARL. Supt., Water Filtration Plant, Winnetka, Ill.	May 26, 1930
W LEISEN, THEODORE A. Gen. Mgr., Metropolitan Utilities District, Utilities Bldg., Harney & 18th Sts., Omaha, Neb.	June 7, 1904
APW LENDALL, HARRY N. Engineering Dept., Rutgers College, New Brunswick, N. J.	Mar. 6, 1923
W LENERT, LOUVA G. Chief Engr., State Board of Health, Jacksonville, Fla.	Mar. 31, 1932
LENHARDT, LAWRENCE G. Commissioner of Public Works, City Hall, Detroit, Mich.	June 10, 1920
LEONARD, JAMES M. Supt., Virginia & Gold Hill Water Co., Virginia City, Nev.	May 10, 1930
W LEONARD, W. D. Mgr., Water, Light & Gas Plants, 101 N. Main St., Fort Atkinson, Wis.	July 21, 1922
W LEOPOLD, F. O. Pres., F. B. Leopold Co., Inc., 422 First Ave., Pittsburgh, Pa.	Apr. 9, 1930
W LE SAGE, THOMAS W. 9577 La Salle Road, Ville La Salle, Que., Canada	Apr. 24, 1916
W LESLIE, JAMES. Canadian Fire Underwriters Association, Coristine Bldg., Montreal, Que., Canada	May 5, 1920
W LEVY, A. G. Engr. of Construction & Surveys, 1556 Ansel Road, Suite 14, Cleveland, O.	May 17, 1910
P LEWIS, ALVIN M. Asst. Supt., 323 County-City Bldg., Seattle, Wash.	Jan. 31, 1929
LEWIS, F. C. Thomaston, Ga.	Mar. 4, 1930
PW LEWIS, GEO. A. Hydrographer, Box 47, Independence, Calif.	July 17, 1934
APW LEWIS, J. E. Supt., Yorba Linda Water Co., Yorba Linda, Calif.	Oct. 31, 1929
W LEWIS, JOHN V. Dept. of Public Works, 54 Court St., Rochester, N. Y.	Feb. 18, 1921
W LIBBY, FRANK D. Chemist, Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.	May 23, 1923

Joined

5, 1924	W LIMB, JOHN M. Chief Chemist, Western Australia Government Railways, Midland Junction, W. Australia.....	Apr. 27, 1928
28, 1934	W LINDSTEN, H. C. Dist. Mgr., Wallace & Tiernan, Ltd., 301 Bank of Hamilton Bldg., Winnipeg, Man., Canada.....	Dec. 30, 1929
17, 1926 23, 1932	LINGLEY, RALPH G. City Engr., 33 City Hall, Worcester, Mass.....	Mar. 13, 1929
10, 1906	PW LINK, ERWIN. Director, City Water Works, Hohnestr. 27, Stuttgart, Germany.....	June 22, 1929
26, 1924 24, 1931	APW LIPPE, LOUIS E. H. City Engr., Joliette, Que., Canada.....	Jan. 13, 1934
9, 1932	APW LITTLE, Beekman C. Sect., American Water Works Association, 305 Cutler Bldg., Rochester, N. Y.....	June 24, 1903
15, 1922	LITTRELL, JAMES J. Supt., City Water Works, 130 S. Main St., Elkhart, Ind.....	Feb. 15, 1930
13, 1925	LIVINGSTONE, J. S. Supt. of Water Works, Mount Forest, Ont., Canada.....	Mar. 31, 1930
31, 1929	LOCHRIDGE, ELBERT E. Engr., Water Dept., P. O. Box 1238, Springfield, Mass.....	July 10, 1906
5, 1912	LOFTON, H. M. Gen. Mgr. & Treas., Columbian Iron Works, Chattanooga, Tenn.....	May 25, 1895
21, 1912	LONERGAN, G. J. Town Engr., P. O. Box 395, Buckingham, Que., Canada.....	Mar. 20, 1933
6, 1927 4, 1911	APW LONG, JOHN S. Supt. of Water, Tampa, Fla.....	May 31, 1933
26, 1930	LONGLEY, F. F. Lock Joint Pipe Co., P. O. Box 21, Ampere, N. J.....	July 18, 1907
7, 1904	LONGWELL, JOHN S. Chief Engr. & Gen. Mgr., East Bay Municipal Utility District, 512-16th St., Oakland, Calif.....	Oct. 28, 1931
6, 1923	APW LOSEE, JAMES R. Engr. & Supt., Water Works, 65 Main St., Tarrytown, N. Y.....	July 28, 1928
31, 1932	W LOUGHRAN, JAMES F. Civil Engr., 292 Fair St., Kingston, N. Y.....	Jan. 19, 1926
0, 1920	APW LOUNSBURY, WM. C. Gen. Mgr., Superior Water, Light & Power Co., Superior, Wis.....	May 12, 1908
0, 1930	APW LOURIE, G. E. Water Works Supt., P. O. Box 388, Bristol, Conn.....	Sept. 20, 1923
1, 1922	PW LOVEJOY, J. W. Supt., Water & Light System, Laurens, S. C.....	Apr. 16, 1930
9, 1930	PW LOVEJOY, WM. H. Supt. of Filtration, Crescent Hill Plant, Louisville Water Co., Louisville, Ky.....	June 4, 1908
4, 1916	W LOVELAND, CHESTER H. Cons. Engr., 1010 Bank of Italy Bldg., San Francisco, Calif.....	Oct. 22, 1924
5, 1920	PW LOWER, J. R. Chemist-in-Charge, Water Works, Bucyrus, O.....	Sept. 28, 1927
7, 1910	AW LOWTHER, BURTON. Cons. Engr., 723 Colorado Bldg., Denver, Colo.....	June 21, 1921
1, 1929 4, 1930 7, 1934	APW LUCE, ARTHUR T. Federal Water Service Corp., 27 William St., New York, N. Y.....	Apr. 10, 1919
4, 1929	W LUIPPOLD, G. T. Dist. Mgr., Wallace & Tiernan Co., Inc., 304 Hohm Bldg., 3923 W. 6th St., Los Angeles, Calif.....	Feb. 16, 1924
3, 1921	LUND, CARL. Director of Water, 107 City Hall, 65 Niagara Sq., Buffalo, N. Y.....	Apr. 30, 1930
3, 1923	LUNDELL, GEORGE R. Asst. Chemist & Bacteriologist, Fridley Filtration Plant, Minneapolis, Minn.....	Aug. 8, 1927
	LUTHER, ROBERT W. Supt., Water Works, Box 38, Elizabeth City, N. C.....	Jan. 11, 1930
	LUTHY, FRED. Chief Engr., Water Dept., Orange, N. J.....	June 8, 1921
	LYBROOK, W. M. Civil Engr., 407 Victoria St., Greensboro, N. C.....	Oct. 13, 1931
	W LYLE, N. B. Scranton-Spring Brook Water Service Co., 135 Jefferson Ave., Scranton, Pa.....	June 17, 1926
	PW LYLES, JOSEPH E. Chemist, Filtration Plant, Tampa, Fla.....	Jan. 1, 1927
	P LYNCH, THOMAS C. Supt., Meter Dept., Water Works, Dewey Ave. & Bloss St., Rochester, N. Y.....	Feb. 17, 1927

	Joined
LYNN, A. B. Mgr., South Pittsburgh Water Co., 238 Brownsville Road, Pittsburgh, Pa.	May 31, 1930
PW LYON, A. S. Supt. of Public Works, Rocky Mount, N. C.	Dec. 8, 1923
APW MAABS, ARTHUR J. Construction Engr., Johns-Manville Corp., 22 E. 40th St., New York, N. Y.	June 2, 1934
PW MABEE, WILLIAM C. Chief Engr. Indianapolis Water Co., 113 Monument Circle, Indianapolis, Ind.	Dec. 19, 1924
AP MACDONALD, C. C. Asst. Treas., West Virginia Water Service Co., 814 Peoples Bank Bldg., Charleston, W. Va.	Oct. 23, 1920
MACDONALD, EDWARD. Foreman, Water Dept., Melvindale, Mich.	Aug. 10, 1932
W MACDONALD, EMMETT. Mgr., Illinois Water Service Co., Sterling, Ill.	June 7, 1904
PW MACDONALD, GEO. L. Asst. Engr., Wallace & Tiernan, Ltd., 278 Spadina Road, Toronto, 12, Ont., Canada	Oct. 23, 1933
PW MACDONALD, W. E. City Water Works Engr., 21 Fourth Ave., Ottawa, Ont., Canada	May 8, 1917
W MACE, O. E. Chief Chemist, Chesapeake & Ohio Ry. Co., Room 407, C. & O. Station, Huntington, W. Va.	Aug. 14, 1933
APW MACKSEY, HENRY V. Supt. of Public Works, City Hall, Woburn, Mass.	May 28, 1924
MACQUEEN, PHILIP O. 300 McMillan Park Drive, Washington, D. C.	May 28, 1924
W MAFFITT, DALE L. Gen. Mgr., Munic. Water Plant, Des Moines, Iowa	Apr. 2, 1918
PW MAFFITT, HOWARD C. Cons. Chemist, 526-11th St., Des Moines, Iowa	Dec. 20, 1926
P MAGEE, W. G. Supt., Water & Light Dept., P. O. Box 452, Morehead City, N. C.	May 10, 1930
W MAHLIE, WINFIELD S. Chemist in Charge, Filtration Plant, Fort Worth, Tex.	Feb. 28, 1923
W MALCOLM, WILLIAM L. Prof. of Munic. Engineering, Queens University, Kingston, Ont., Canada	Mar. 7, 1934
PW MALLAY, P. D. Gen. Mgr., Transite Pipe Dept., Johns-Manville Corp., 22 E. 40th St., New York, N. Y.	Feb. 28, 1934
W MALMROS, CHARLES, JR. Supt. of Water, Highland Park, N. J.	Jan. 4, 1929
MALONE, JAMES J. Supt., Bureau of Water, Municipal Bldg., Lancaster, Pa.	Mar. 26, 1934
MALONEY, THOMAS. Trustee, City Water Works, Council Bluffs, Iowa	Mar. 27, 1930
W MANAHAN, ELMER G. Cons. Engr., 445 Gramatan Ave., Mount Vernon, N. Y.	June 8, 1909
PW MANAHAN, PATRICK. Supt., Water Works, Briarcliff Manor, N. Y.	May 27, 1924
P MANBERT, CAL R. Construction Engr., East Bay Municipal Utility District, 512-16th St., Oakland, Calif.	Aug. 24, 1933
W MANGUN, L. B. Chemist in Charge, Water Purification, Kansas City, Kans.	Feb. 23, 1920
AP MANNING, R. G. Supt., Water Dept., 1111 Madison St., Lockport, Ill.	May 22, 1934
PW MANOCK, FOSTER. Reliable Iron Foundry, 1583 Fishburn St., Los Angeles, Calif.	Nov. 7, 1932
PW MANSFIELD, MYRON G. Div. Engr., Morris Knowles, Inc., 507 Westinghouse Bldg., Pittsburgh, Pa.	June 11, 1924
AP MANSON, A. B. Gen. Mgr., Public Utility Commission, Stratford, Ont., Canada	Feb. 15, 1930
P MARCHANT, ORSON H. Blair & Marchant, Inc., 100 Crown St., P. O. Box 236, New Haven, Conn.	Mar. 19, 1930
MARONEY, C. P. Pres., Board of Water Commissioners, 9th & King Sts., Wilmington, Del.	Feb. 28, 1930

		Joined
31, 1930	MARQUIS, J. K. Engr. in Charge of Plant, Spartanburg Water Works, R. No. 2, Chesnee, S. C.	July 14, 1930
8, 1923	MARS, A. D., Jr. Mgr., Neptune Meter Co., 1700-15th St., Denver, Colo.	Dec. 16, 1926
2, 1934	A MARSHALL, G. A. Chief Clerk, Bureau of Water Works, 108 City Hall, Portland, Ore.	Apr. 16, 1930
19, 1924	W MARSHALL, L. A. Supt., Division Filtration Plant, Division Ave. & W. 32nd St., Cleveland, O.	May 26, 1921
23, 1929	W MARSTON, FRANK A. Cons. Engr., Metcalf & Eddy, Cons. Engrs., 1300 Statler Bldg., Boston, Mass.	Feb. 20, 1922
10, 1932	MARTIN, J. C. Supt., Water Dept., Tarboro, N. C.	July 1, 1930
7, 1904	PW MARTIN, MILES H. Water Works Engr., Weston, W. Va.	July 1, 1934
3, 1933	MARTIN, PHIL J., Jr. City Water Supt., 224 N. Highland Ave., Tucson, Ariz.	Mar. 26, 1931
8, 1917	AP MARTINDALE, R. H. Supt. of Water Works, Sudbury, Ont., Canada.	Sept. 30, 1929
4, 1933	MARTINDALE, R. W. Pacific Coast Mgr., United States Pipe & Foundry Co., 907 Monadnock Bldg., San Francisco, Calif.	Nov. 8, 1923
8, 1924	W MARTINEZ, ROLANDO A. Cons. Engr., Obispo No. 59, Havana, Cuba.	Dec. 20, 1927
8, 1924	MARVIN, GEORGE. Supt. of Water & Light Dept., Marshfield, Wis.	Sept. 3, 1924
2, 1918	W MARX, C. D. 357 Kingsley, Palo Alto, Calif.	Nov. 6, 1924
9, 1926	W MASON, S. J. Engr. & Supt., Water Works, Perth Amboy, N. J.	May 7, 1917
1, 1930	W MASSING, A. Chemist & Bacteriologist, Central Laboratory of Holland, Utrecht, Holland.	July 20, 1921
1, 1923	APW MATHER, EDWARD K. Cons. Civil Engr., 309-13 Western Bldg., Mitchell, S. D.	Nov. 15, 1929
1, 1934	W MATHESON, D. H. Chemist & Bacteriologist, Beach Filtration Plant, Box 86, R. R. 5, Hamilton, Ont., Canada.	May 23, 1934
1, 1934	MATHEWS, EVERETT R. Chemist, Water Laboratory Division, State Hygienic Laboratories, Iowa City, Iowa.	May 22, 1934
1, 1929	AP MATHEWS, F. ROCKWELL. Water Supt., Mount Kisco, N. Y.	Jan. 1, 1934
1, 1934	PW MATHEWS, W. W. 1510 S. 2nd St., Aberdeen, S. D.	Nov. 18, 1925
1, 1930	PW MATTE, HUBERT P. T. Commercial Engr., Worthington Pump & Machinery Corp., Harrison, N. J.	July 26, 1913
1, 1909	W MATTER, L. D. Dist. Engr., State Dept. of Health, Kirby Health Center, Wilkes-Barre, Pa.	May 3, 1923
1, 1924	AP MATTHEWS, IRVING E. 43 Harding Road, Rochester, N. Y.	May 25, 1919
1, 1933	MATTOON, STANLEY F. Cast Iron Water Pipe Inspector, The Anderson-Mattoon Co., 529 Central Bldg., Los Angeles, Calif.	May 26, 1930
1, 1920	MAUCH, THEO. C. M. Supt., Pumping Stations, Indianapolis, Water Co., Indianapolis, Ind.	Dec. 29, 1924
1, 1934	P MAUPIN, THOMAS J. Supt. of Pipe Line, R. 1, Box 147 A, Sandy, Ore.	May 22, 1934
1, 1932	MAUZY, ANDREW B. Chief Engr., Bureau of Water, City Hall, Jersey City, N. J.	Dec. 8, 1922
1, 1924	MAVIS, FREDERIC T. Assoc. Dir., Iowa Inst. of Hyd. Research, Acting Head of Dept. of Mechanics & Hydraulics, State Univ. of Iowa, Iowa City, Iowa.	Oct. 23, 1925
1, 1930	W MAXWELL, DONALD H. Principal Asst. Engr., Alvord, Burdick & Howson, Cons. Engrs., 1401 Civic Opera Bldg., Chicago, Ill.	Feb. 15, 1917
1, 1930	W MAY, CHARLES E. Supt. of Water Works & Public Property, City Hall, Meridian, Miss.	Jan. 31, 1933
1, 1930	AP MAYER, EDWARD B. Asst. C. E. Dept. of Water & Power, 207 S. Broadway, Los Angeles, Calif.	Oct. 31, 1929

	Joined
APW McALARY, ALLAN. Supt. & Treas., Camden & Rockland Water Co., Box 151, Rockland, Me.	Apr. 18, 1922
APW McAMIS, JAMES W. Supt. of Water Works, Greeneville, Tenn.	Sept. 12, 1921
McARTHUR, J. W. Gen. Supt-Sect., Eugene Water Board, City Hall, Eugene, Ore.	Apr. 25, 1933
McCAFFREY, WM. A. Supt. of Water Works, 191 E. 6th St., Oswego, N. Y.	June 21, 1920
APW McCARTHY, OWEN A. Supt. of Water Supply, Michigan & Schaefer Roads, Dearborn, Mich.	Mar. 3, 1927
McCASKEY, AMBROSE E., JR. West Virginia Water Service Co., Charleston, W. Va.	July 1, 1934
McCLEARY, E. L. Supt., Silverton Water Commission, Silverton, Ore.	June 6, 1934
McCLELLAN, THOMAS D. United Piece Dye Works, Lodi, N. J.	Aug. 28, 1924
PW McCLENAHAN, W. T. Senior Civil Engr., Sanitary District of Chicago, 6218 University Ave., Chicago, Ill.	Apr. 7, 1914
McCLINTOCK, S. L. D. Dist. Sales Mgr., Badger Meter Mfg. Co., 412 Wabash St., Mattoon, Ill.	Mar. 2, 1934
McCLURE, IRA E. Supt. of Water Works, Columbus, Mont.	Mar. 27, 1925
W McCRADY, MAC HARVEY. Chief of Laboratories, Quebec Provincial Bureau of Health, 59 Notre Dame, E., Montreal, Que., Canada.	Apr. 7, 1916
PW McCBONE, DONALD G. Filtration Plant Supt., E. B. Eddy Co., Hull, Que., Canada.	May 31, 1933
PW McCURDY, H. S. R. Chief Engr., Philadelphia Suburban Water Co., 762 Lancaster Ave., Bryn Mawr, Pa.	July 16, 1927
McCURDY, HOWARD. City Engr. & Supt. of Water Works, 4305 Santa Fe Ave., Vernon, Calif.	Dec. 29, 1925
APW McDONALD, ROLAND G. Village Engr., Municipal Bldg., East Rochester, N. Y.	Aug. 6, 1931
McDONNELL, ROBERT E. Burns & McDonnell Engineering Co., 107 W. Linwood Blvd., Kansas City, Mo.	May 25, 1913
McDOWELL, FRANCIS B., JR. Asst. Mgr. & Engr., Commissioners of Public Works, Charleston, S. C.	June 25, 1929
McEVOY, J. W. Supt., Water Works, Dubuque, Iowa.	May 13, 1919
APW McFAUL, W. L. City Engr. & Mgr. of Water Dept., City Hall, Hamilton, Ont., Canada.	Mar. 8, 1924
McGARIGLE, J. A. Busfield McLeod, Ltd., 73 Adelaide St., W., Toronto, Ont., Canada.	Jan. 1, 1933
A McGONIGALE, WM. J. Treas., Inter-state Water Co., 203 N. Jackson St., Louisville, Ky.	Apr. 5, 1912
McINNES, F. A. Cons. Engr., 264 Bay State Road, Boston, Mass.	May 12, 1914
P McJANNET, WM. L. Provincial Secretary's Dept., Prisons & Reformatories Branch, Parliament Bldgs., Toronto, Ont., Canada.	Apr. 20, 1934
McKAY, GEORGE, JR. Pres., The Leadite Co., Girard Trust Co. Bldg., Philadelphia, Pa.	Apr. 9, 1930
McKENNA, FRANCIS C. Chemist, C. & O. Ry. Co., 1131-9th St., Huntington, W. Va.	Dec. 5, 1928
PW McKINNON, R. W. Chief Engr. of Reclamation, Province of Manitoba, Winnipeg, Man., Canada.	Apr. 16, 1934
P McLAUGHLIN, H. L. Salesman, National Meter Co., 1310 Race St., Denver, Colo.	Mar. 10, 1926
PW McLAUGHLIN, PHILIP L. Div. San. Engr., West Virginia Water Service Co., 183 Summers St., Charleston, W. Va.	July 12, 1928
APW McLEAN, R. F. Supt. of Water Dept., Walla Walla, Wash.	June 29, 1928
McLEOD, J. A. Asst. Chief Inspector, Bureau of Engineering, State Board of Health, Raleigh, N. C.	Apr. 23, 1924

		Joined
	McLURE, J. H. City Engr., Chester, S. C.	Apr. 22, 1929
18, 1922 12, 1921	PW McMANAMNA, T. L. Civil Engr., 212 Duplex Ave., Toronto, Ont., Canada	Jan. 18, 1934
25, 1933	W McMILLAN, J. A. Mgr. of Water Works, Charlottetown, P. E. I., Canada	Mar. 16, 1927
21, 1920	AP McMILLAN, W. BRUCE. Cons. Engr., Box 224, Palo Alto, Calif.	May 31, 1928
3, 1927	W McNAMEE, ROBERT L. Shoecraft, Drury & McNamee, State Savings Bank Bldg., Ann Arbor, Mich.	June 17, 1926
1, 1934	AP McQUEEN, LEO E. Supt., Board of Public Works, Coldwater, Mich.	Apr. 13, 1923
6, 1934 28, 1924	McWILLIAMS, D. E. Pres., Bear Gap Water Co., Mgr., Roaring Creek Water Co., Box 17, Shamokin, Pa.	Mar. 16, 1922
7, 1914	W MEADOWS, J. O. San. Engr., J. T. Donald & Co., Ltd., 1181 Guy St., Montreal, Que., Canada	June 21, 1920
2, 1934 27, 1925	MEDFORD, HUGH L. Asst. Engr., Dept. of Public Works & Service, 513 N. Mendenhall St., Greensboro, N. C.	July 30, 1931
7, 1916	MEEKER, W. L. Supt., Water Works Co., Clinton, Iowa	Oct. 10, 1928
31, 1933	PW MELLEN, ARTHUR F. Filtration Engr., Columbia Heights Filtration Plant, Minneapolis, Minn.	Mar. 24, 1915
16, 1927	MELLON, T. A. Pres., Kensington Water Co., 2112 Oliver Bldg., P. O. Box 1114, Pittsburgh, Pa.	June 24, 1903
29, 1925	MELTON, J. P. Mgr. of Water Works, Ashland, Va.	July 21, 1934
6, 1931	MELVIN, M. M. State Board of Health, Raleigh, N. C.	Jan. 1, 1934
5, 1929 3, 1919	MENG, B. B. Supt. of Water Works, Winnsboro, S. C.	Apr. 22, 1929
8, 1924	W MENTZ, HENRY A. Cons. Engr., Lock Drawer No. 929, Hammond, La.	Oct. 7, 1919
1, 1933	W MERCKEL, F. G. Wallace & Tiernan Co., Inc., P. O. Box 178, Newark, N. J.	Jan. 29, 1921
5, 1912	PW MEREDITH, E. P. Supt., Water Works, Washington, N. C.	Jan. 11, 1930
2, 1914	MERRIMAN, THADDEUS. Cons. Engr., 611 W. 110th St., New York, N. Y.	May 29, 1920
0, 1934	MERRITT, WILL D. Supt., Water Dept. & City Engr., Mount Airy, N. C.	Oct. 31, 1930
0, 1930	MERRYFIELD, FRED. Asst. Prof. of Civil Engineering, Oregon State College, Corvallis, Ore.	May 22, 1934
5, 1928	W MESSER, RICHARD. San. Engr., State Dept. of Health, 615 State Office Bldg., Richmond, Va.	Sept. 27, 1911
3, 1934	MEYER, ED. Water Works Supt., Hespeler, Ont., Canada	Apr. 4, 1932
0, 1926	PW MEYER, H. R. J. Civil Engr., Supply & Purifying Section, Water Dept., 1640 S. Kingshighway, St. Louis, Mo.	Jan. 19, 1925
2, 1928 7, 1928	P MEYERHERM, CHARLES F. Albert F. Ganz, Inc., 511-5th Ave., New York, N. Y.	Jan. 26, 1922
4, 1924	MEYERS, DUDLEY C. Commissioner of Public Works & Supt. of Water, Municipal Bldg., Oak Park, Ill.	Apr. 9, 1925
	AP MICHAELS, A. P. 3446 Golfview Blvd., Orlando, Fla.	Aug. 15, 1924
	W MICHAU, R. Asst. Engr. to Gen. Supt., Paris City Water & Sewerage Dept., 17, Boulevard Delessert, Paris, France.	Mar. 3, 1927
	MICHIE, JOHN C. C. E., Durham, N. C.	June 24, 1903
	PW MIELDAZIS, J. J. San. Engr., 66 S. Santa Cruz St., Ventura, Calif.	Feb. 20, 1931
	W MILLER, ARTHUR P. San. Engr. in Charge, Interstate San. Dist. No. 1, U. S. Public Health Service, Sub-Treasury Bldg., 2nd Floor, New York, N. Y.	Sept. 25, 1920
	MILLER, CHARLES F. Supt. of Repairs, Water Dept., 73 Vermont St., Rochester, N. Y.	Apr. 10, 1926
	W MILLER, CLIFFORD N. Hyd. Engr., 3233 Fairfield Ave., Cincinnati, O.	May 13, 1915
	MILLER, H. I. Vice-Pres., Pacific Water Works Supply Co., Atlantic St. Terminal, Pier "A", Seattle, Wash.	Jan. 17, 1928
	MILLER, RUSSELL. Supt., Water & Light Plant, Amory, Miss.	Apr. 22, 1930

	Joined
APW MILLER, WALLACE T. Supt., Board of Water Commissioners, Municipal Bldg., Ossining, N. Y.	Aug. 14, 1933
APW MILLER, WARREN C. City Engr., City Hall, St. Thomas, Ont., Canada	Feb. 28, 1923
MILLER, WM. C. Supt. of Water Works, 316 Earl St., Daytona Beach, Fla.	Aug. 16, 1934
MILLS, R. T. Supt. of Water Works, Southern Pines, N. C.	Oct. 31, 1930
APW MINOR, EDWARD E. Gen. Mgr., New Haven Water Co., New Haven, Conn.	May 20, 1912
APW MINOR, L. O. Supt. of Water Works, Plattsmouth, Neb.	July 8, 1922
P MISKER, ALVIN S. Supt. of Water Works, Herrin, Ill.	Apr. 16, 1930
MITCHELL, GEORGE W. Dist. Mgr., Wallace & Tiernan Co., Inc., 917 Terminal Sales Bldg., Seattle, Wash.	July 1, 1934
W MITCHELL, LEWIS. Belmont, Ilkley, Yorkshire, England	Nov. 15, 1924
MITCHELL, LLOYD D. 115 Main St., Oshkosh, Wis.	Apr. 10, 1931
APW MITCHELL, LOUIS. Dean, College of Applied Science, Syracuse University, Syracuse, N. Y.	Mar. 7, 1932
W MOAT, CHARLES P. Chemist, State Board of Health, 2 Colchester Ave., Burlington, Vt.	Jan. 29, 1915
W MOHLMAN, FLOYD W. Chief Chemist, Sanitary District of Chicago, 845 S. Wabash Ave., Chicago, Ill.	Oct. 22, 1921
MOIR, DONALD. Mgr., Montevideo Water Works Co., 1395 Zabala, Montevideo, Uruguay	June 25, 1924
W MOLIS, WM. Superintendent, Water Works, Muscatine, Iowa	Mar. 15, 1882
MONRO, ALBERT. Supt., Pipe Construction, Los Angeles Dept. of Water & Power, 141 N. Meyler St., San Pedro, Calif.	Oct. 31, 1930
MONROE, H. L. Supt. of Water Works, Pontiac, Mich.	July 10, 1919
PW MONTANK, IRWIN A. Water Bacteriologist & Chemist, 1091-22nd Ave., S. E., Minneapolis, Minn.	Jan. 24, 1928
APW MOON, C. D. Mgr., New Jersey Water Co., 610 Station Ave., Haddon Heights, N. J.	June 10, 1930
APW MOON, PHILIP G. G. Engr. & Gen. Mgr., Bournemouth Gas & Water Co., 136, Old Christchurch Road, Bournemouth, England	Oct. 29, 1932
MOORE, C. HERBERT. Greeley & Hansen, Cons. Engrs., 6 N. Michigan Ave., Chicago, Ill.	July 9, 1928
MOORE, CHARLES E. Vice-Pres. & Treas., Roanoke Water Works Co., 311 Avenham Ave., Roanoke, Va.	Oct. 5, 1923
PW MOORE, GEORGE S. Supt. of Water & Light, Albemarle, N. C.	Apr. 23, 1924
APW MOORER, T. B. Supt. of Water Works, Summerville, S. C.	Nov. 30, 1931
MORALES, RITA. Chief Chemist, Freeport Sulphur Co., 1804 American Bank Bldg., New Orleans, La.	July 10, 1931
W MOREHOUSE, WALLACE W. Director, Dept. of Water, Room 308, U. B. Annex, Dayton, O.	Jan. 16, 1923
PW MOREY, DAVID, JR. San. Engr., 517 Praetorian Bldg., Dallas, Tex.	May 21, 1923
MORLAN, WILBERT. Plant Engr., Long Island Water Corp., Box 215, Valley Stream, N. Y.	May 24, 1922
DAPW MORRIS, SAMUEL B. Chief Engr., Water Dept., 319 City Hall, Civic Center, Pasadena, Calif.	June 10, 1920
PW MORRISON, THOMAS J. Commissioner of Public Works, 54 Court St., Rochester, N. Y.	Mar. 30, 1934
MORROW, BEN. S. Engr., Water Bureau, 211 City Hall, Portland, Ore.	Apr. 13, 1926
APW MORSE, HOWARD S. Gen. Mgr., Indianapolis Water Co., 113 Monument Circle, Indianapolis, Ind.	Sept. 18, 1925
APW MORSE, ROBERT B. Chief Engr., Washington Suburban Sanitary District, Hyattsville, Md.	Mar. 11, 1915

		Joined
	PW MOSELEY, ALEX W. 1709 Chicago Ave., Evanston, Ill.....	Oct. 11, 1923
	W MOSES, HOWARD E. Asst. Chief Engr., State Dept. of Health, 1421 N. Front St., Harrisburg, Pa.....	Apr. 27, 1922
	P MOSIER, CORTLAND. Supt., Spring Valley W. W. & Sup. Co., 147 Main St., Spring Valley, N. Y.....	Dec. 31, 1929
	MOSS, E. H. Supt. of Plants, High Point, N. C.....	July 1, 1930
	PW MOUCHETTE, LUCIEN. Civil Engr., Hauts Fourneaux et Fon- deries de Pont-a-Mousson, Pont-a-Mousson, France....	June 25, 1930
	MOULLET, LOUIS F. Mech. Engr., East Bay Municipal Utility District, 2127 Adeline St., Oakland, Calif.....	May 28, 1926
	APW MOUNCE, WAYNE. Filter Plant Supt., Municipal Water Dept., City Hall, Lewiston, Ida.....	June 18, 1934
	P MOWER, CHARLES M., JR. Field Engr., The Pitometer Co., 50 Church St., New York, N. Y.....	May 26, 1930
	W MOWREY, J. HASE. Mgr. of Public Utilities, 202 S. Second St., Chambersburg, Pa.....	July 20, 1925
	PW MOWRY, CHARLES W. Fire Protection Engr., 184 High St., Boston, Mass.....	June 30, 1929
	W MUDGE, JOHN R. Pres. & Gen. Mgr., Chemical Equipment Corp. of Calif., 414 Arroyo Drive, South Pasadena, Calif.....	May 27, 1924
	W MUEGGE, O. J. Asst. San. Engr., State Board of Health, 656 Crandall Ave., Madison, Wis.....	May 20, 1925
	APW MULLERGREN, ARTHUR L. Cons. Engr., 202 Fairfax Bldg., Kansas City, Mo.....	Oct. 21, 1919
	W MULLIGAN, D. G. Mountain States Inspection Bureau, P. O. Box 1740, Denver, Colo.....	Mar. 26, 1928
	PW MUMA, DANIEL O. Supt., Holland Water Works, Holland, N. Y.....	May 9, 1934
	MUNDY, AMBROS. Supt., Middlesex Water Co., Woodbridge, N. J.....	Mar. 11, 1914
	APW MUNN, HARVEY T. Hyd. Engr., National Board of Fire Underwriters, 222 W. Adams St., Chicago, Ill.....	Mar. 9, 1920
	A MUNRO, E. C. 1308 Pease Road, Austin, Tex.....	June 24, 1929
	MUNROE, WALTER C. Chief Engr., Anne Arundel County Sanitary Commission, Savings Bank Bldg., Annapolis, Md.....	Jan. 30, 1924
	MUNYAN, E. A. Mgr., Gas Dept., Union Gas & Electric Co., Fourth & Main Sts., Cincinnati, O.....	Oct. 31, 1930
	MURDOCH, JOHN H., JR. Uniontown Water Co., Washing- ton, Pa.....	May 31, 1930
	APW MURNANE, DAVID J. Water Engr., Municipal Offices, Singa- pore, Straits Settlements.....	Nov. 15, 1929
	PW MURPHY, A. R., C.E. Fountain City, Tenn.....	Apr. 7, 1911
	MURPHY, FRANK J. Supt., Division of Meters, Milwaukee Water Works, City Hall, Milwaukee, Wis.....	May 31, 1916
	W MURRAY, R. M. Resident Engr., 9125 View Ave., Seattle, Wash.....	Feb. 11, 1922
	APW MUSER, E. FRED. Mgr., Chester Water Service Co., Fifth & Welsh Sts., Chester, Pa.....	Dec. 22, 1920
	APW MUSSER, H. P. Pres., Mullens Water Works, Kanawha Na- tional Bank Bldg., Charleston, W. Va.....	Oct. 31, 1922
	P NEBELUNG, GEORGE H. Asst. Engr., Scranton-Spring Brook Water Service Co., 1522 Mulberry St., Scranton, Pa.....	Oct. 11, 1921
	NELSON, FRED B., C.E. 950 Woodycrest Ave., Highbridge, N. Y.....	July 18, 1907
	APW NELSON, GEORGE A. Supt. of Water Works, City Hall, Boone, Iowa.....	June 6, 1927

	Joined
PW NELSON, H. LLOYD. United States Pipe & Foundry Co., 2437 Koppers Bldg., Grant St. & Seventh Ave., Pittsburgh, Pa.	May 15, 1930
W NEVLING, J. B. Sect.-Treas., Clearfield Water Co., Clearfield, Pa.	Oct. 16, 1914
NEWELL, CLARK. Supt. of Water Works, Provo City, Utah.	July 23, 1928
P NEWKIRK, S. F., JR. Engr. & Supt., Board of Water Commissioners, 18 W. Jersey St., Elizabeth, N. J.	Oct. 18, 1927
PW NEWLANDS, JAMES A. San. Engr., 11 Laurel St., Hartford, Conn.	Oct. 14, 1914
PW NEWLANDS, WILLIAM. Water Works Engr., Town Hall, Bradford, Yorkshire, England.	Feb. 10, 1931
NEWSOM, REEVES J. Pres., Community Water Service Co., 100 William St., New York, N. Y.	Nov. 18, 1918
NICHOLS, GEORGE W. Mech. Engr., 5333 Vine St., Philadelphia, Pa.	June 17, 1930
NICHOLS, M. STARR. Chemist, State Laboratory of Hygiene, Madison, Wis.	Jan. 1, 1926
PW NICHOLS, ROBERT L. Supt., Big Bethel Water Development, Box 110, Route 2, Hampton, Va.	Mar. 5, 1924
APW NICOL, THOMAS B. Civil Engr., 341 Pitt St., Sydney, N. S. W., Australia.	July 28, 1933
P NIEMEYER, H. W. Asst. Engr., Indianapolis Water Co., R. R. 9, Box 655, Indianapolis, Ind.	Apr. 16, 1930
APW NIESLEY, W. M. Asst. to Sect., American Water Works Association, 29 W. 39th St., New York, N. Y.	Apr. 30, 1924
NISBET, GEORGE A. Water Supt., Palisades, Colo.	Oct. 1, 1934
P NISSLY, WARREN B. Engr. of Water Supply, Reading Co., 400 Gregg St., Shillington, Pa.	May 8, 1930
P NOBLE, MILFORD S. Supt., Water Dept., 145 Hawthorne Ave., Palo Alto, Calif.	Apr. 22, 1931
W NOBLE, RALPH E. Principal Bacteriologist, Board of Health, Bureau of Laboratories, Room 712, City Hall, Chicago, Ill.	Mar. 22, 1927
NOLL, J. F. Supt. of Water Works, 215 Elizabeth St., Harrisonburg, Va.	May 15, 1930
PW NOLTE, AUGUST G. San. Engr., 1327 Veronica Ave., St. Louis, Mo.	Dec. 30, 1916
PW NORCOM, GEORGE D. Federal Water Service Corp., 27 William St., New York, N. Y.	June 10, 1921
APW NORDBERG, BRUNO V. E. Executive Engr., 625 N. 50th St., Milwaukee, Wis.	Jan. 9, 1933
AP NORMAN, EARL E. Supt., Dept. of Public Utilities, City Hall, Kalamazoo, Mich.	Sept. 11, 1924
W NORRIS, M. ALVIN. Chemist, 487 N. Highland Ave., N. E., Atlanta, Ga.	Feb. 10, 1927
APW NORTHROP, GUY C. Gen. Sales Mgr., Hydraulic Development Corp., 50 Church St., New York, N. Y.	Oct. 25, 1933
NORTHROP, L. E. Mgr., Los Angeles Branch Office, Neptune Meter Co., 701 E. Third St., Los Angeles, Calif.	Sept. 30, 1929
W NORTON, JOHN F. The Upjohn Co., Kalamazoo, Mich.	May 25, 1926
APW NORTON, WILLIAM A. Water Treatment Plant Operator, Los Angeles Dept. of Water & Power, 1718 Lakme Ave., Wilmington, Calif.	Apr. 14, 1933
NUEBLING, EDWARD, C.E. 525 W. 238th St., Riverdale, New York, N. Y.	Mar. 31, 1925
NUSSBAUMER, NEWELL L. Nussbaumer & Clarke, Inc., Engrs., 33 S. Division St., Buffalo, N. Y.	May 9, 1934
P NUTTING, N. C. Local Mgr., California Water Service Co., 308 S. Catalina Ave., Redondo Beach, Calif.	Sept. 21, 1933

		Joined
	P ODENWELDER, ASHER J., JR. Pres., Lehigh Water Co., Easton Trust Co. Bldg., Easton, Pa.	May 20, 1931
15, 1930	AP OKE, E. E. W. Mgr., Public Utilities Commission, Palmerston, Ont., Canada	July 24, 1934
16, 1914 23, 1928	W OLD, HOWARD N. San. Engr., U. S. Public Health Service, Room 304, U. S. Marine Hospital, 210 State St., New Orleans, La.	Oct. 24, 1932
18, 1927	W OLSON, W. M. Filter Plant, Lake & Michigan Ave., Wilmette, Ill.	Apr. 10, 1926
4, 1914	O'NEILL, CHRIS. Supt. of Water, Lake Geneva, Wis.	Feb. 15, 1930
0, 1931	PW O'NEILL, JOHN H. State Board of Health, New Orleans, La.	Apr. 27, 1925
8, 1918	APW OPPERMAN, RICHARD H. Librarian, United Gas Improvement Co., 1401 Arch St., Philadelphia, Pa.	Jan. 17, 1930
7, 1930	W ORCHARD, WILLIAM J. San. Engr., Wallace & Tiernan Co., Inc., P. O. Box 178, Newark, N. J.	Aug. 16, 1917
1, 1926	APW O'REILLY, A. R. Chief Engr., Bureau of Water, City Hall, Reading, Pa.	May 30, 1925
5, 1924	PW ORNSTEIN, GEORG. Chlorator Ges. m. b. H., Alexandrinenstr. 48, Berlin, S. 14, Germany	Jan. 12, 1928
8, 1933	W ORR, ALEXANDER, C.E. 63 Fox St., Gloversville, N. Y.	Aug. 7, 1909
9, 1930	W ORR, C. A. Dist. Mgr., Kentucky-Tennessee Light & Power Co., Mayfield, Ky.	June 8, 1921
1924 1934	P OSBORN, C. M. Village Mgr., Village Hall, Wilmette, Ill.	Jan. 31, 1931
1930	W OSBORNE, JAMES Q. Dist. Mgr., DeLaval Steam Turbine Co., 516 Fourth Ave., Seattle, Wash.	Jan. 17, 1928
1931	APW O'SHAUGHNESSY, M. M. City Engr., 2732 Vallejo St., San Francisco, Calif.	July 18, 1907
1927	OUTZEN, ANDREW N. Field Engr., Detroit City Gas Co., Detroit, Mich.	Aug. 1, 1923
1930	W OVERSTREET, RALPH M. 1441 S. 4th St., Louisville, Ky.	Jan. 6, 1927
1916	W OWEN, MARVIN H. Supervisor, Chlorine Plants, Los Angeles Dept. of Water & Power, 4932 Denny Ave., North Hollywood, Calif.	Apr. 6, 1933
1921	PW OWENS, GEORGE W. Mgr., Pipe, Valves & Fittings Dept., Ducommun Corp., 219 S. Central Ave., Los Angeles, Calif.	Jan. 1, 1933
1933	P OWENS, RAY F. Supt., Clarks Summit Water Co., Clarks Summit, Pa.	June 17, 1930
1924	OWINGS, NOBLE L. Asst. Engr., Washington Suburban Sanitary District, Riverdale, Md.	Jan. 4, 1923
1927	PW PAGE, GEORGE C. Engr., Kennicott Water Softener Co., Ltd., Wolverhampton, England.	June 10, 1930
1933	PAIN, HERBERT. Phillips & Pain, 31, Rue de la Vanne, Montrouge, Seine, France.	Mar. 27, 1925
1929 1926	PAINTER, CARL E. Vice Pres. & Cons. Engr., Waterworks Equipment Co., Salt Lake City, Utah.	Mar. 25, 1924
933	PAITONI, ANTONIO, C.E. Rivadavia 3772, Buenos Aires, Argentina.	July 27, 1919
925	PALMER, F. F. City Engr. & Water Supt., Box 486, Forsyth, Mont.	July 1, 1934
934	PALMER, HENRY A. Waterworks Engr., The Causeway, Staines, Middlesex, England.	May 20, 1930
933	W PALMER, R. M. Chem. Engr., 500 Fifth Ave., New York, N. Y.	Apr. 16, 1930
925	APW PALMES, G. H. Mgr., City Water Works, Raton, N. M.	Jan. 18, 1934
934	PARDEE, HOWARD J. San. Engr., 151 W. 105th St., New York, N. Y.	Mar. 31, 1930
933	APW PARKER, E. F. C. California Water Service Co., Federal Reserve Bank Bldg., San Francisco, Calif.	Sept. 13, 1928

	Joined
W PARKER, FRANCIS L., PhD., M.D. Parker Laboratory, 40 Broad St., Charleston, S. C.	Jan. 31, 1925
PARKER, W. R. Sect.-Treas., Water & Light Commission, Penetanguishene, Ont., Canada	Mar. 7, 1934
PARRATT, S. L. Asst. Civil Engr., Dept. of Water & Power, Box 240, Arcade Annex, Los Angeles, Calif.	Oct. 17, 1931
W PARTRIDGE, E. M. Chief Chemist, Paige & Jones Chemical Co., 425 S. 5th Ave., La Grange, Ill.	Feb. 20, 1925
PW PASSOLT, A. A. Supt., Water & Light Commission, Newnan, Ga.	May 12, 1925
W PATERSON, WILLIAM, M. I. Mech. E. The Paterson Engineering Co., Ltd., Windsor House, Kingsway, London, W. C. 2, England	Nov. 6, 1924
PW PATITZ, G. J. Cons. Engr., Standard Brands, Incorporated, 595 Madison Ave., New York, N. Y.	Oct. 24, 1923
PATRICK, J. G. Chemist, West Virginia Pulp & Paper Co., Luke, Md.	June 10, 1930
APW PATTERSON, RICHARD L. City Engr. & Supt. of Water Dept., Newport Beach, Calif.	Sept. 21, 1928
PATTON, C. S. Mgr., Pipe Division, American Locomotive Co., 220 E. 42nd St., New York, N. Y.	May 31, 1930
AP PATTON, W. S. Mgr., Water Works, Ashland, Ky.	May 7, 1917
PAUL, MARCEL. Pres., Societe Anonyme des Hauts-Fourneaux & Fonderies de Pont-a-Mousson, 9-13 Rue St. Leon, Nancy, France	Feb. 18, 1927
PEABODY, DR. JAMES R. 905 Heyburn Bldg., Louisville, Ky.	Dec. 29, 1924
PW PEARSE, LANGDON. San. Engr., Sanitary District of Chicago, S. O. Bldg., 910 S. Michigan Ave., Chicago, Ill.	Feb. 24, 1913
APW PEARSON, CHARLES D. Engr. & Mgr., Water Works, Kiangse Road, Shanghai, China	Mar. 16, 1922
PW PEARSON, J. F. Supt., Water & Light Plant, 52 S. Middleton St., Orangeburg, S. C.	Feb. 27, 1929
PECK, ERMON M. Cons. Engr., 260 Edgewood St., Hartford, Conn.	July 18, 1907
PW PEDERSEN, H. V. Supt. of Water Works, Municipal Bldg., Marshalltown, Iowa	Mar. 26, 1922
PEDLEY, FRANK B. Water Supt., East La Verne Road, Pomona, Calif.	Nov. 7, 1932
APW PEIRCE, WALTER A. Mgr., Water Dept., City Hall, Racine, Wis.	June 15, 1922
PEIRSON, A. G. Supt., Weston Public Utilities Commission, Weston, Ont., Canada	Feb. 28, 1923
AP PEQUEGNAT, MARCEL, B.A.Sc. Supt., Kitchener Water Commission, Kitchener, Ont., Canada	Feb. 16, 1924
PERKINS, C. E. Supt. of Water Works, Bartlesville Water Co., Bartlesville, Okla.	Feb. 14, 1928
PERRY, H. W. Supt. of Water Works, Box 647, Greenville, S. C.	Apr. 25, 1922
APW PERRY, V. E. Mgr., Water Sales Div., San Francisco Water Dept., 425 Mason St., San Francisco, Calif.	Apr. 16, 1928
W PETERS, J. S. Chief Engr., Marin Municipal Water District, San Rafael, Calif.	Jan. 6, 1927
AP PETRY, HARRY. Supt., City Water Plant, Rushville, Ind.	Feb. 25, 1930
APW PHARAOH, HARRY W. Clymer Water Service Co., Indiana, Pa.	Dec. 8, 1927
W PHELPS, EARLE B. Prof. of Sanitary Science, Columbia University, 630 W. 168th St., New York, N. Y.	Oct. 19, 1914
PW PHILLIPS, JAMES E. Dept. of Water & Power, P. O. Box 240, Arcade Annex, Los Angeles, Calif.	Apr. 30, 1931
PIATT, WILLIAM M. Cons. Engr., Durham, N. C.	Aug. 5, 1921
PICADO, RAMON M. Cons. Engr., Cartago, Costa Rica	May 20, 1930

		Joined
	APW PIERCE, J. F. Tennessee Valley Authority, Knoxville, Tenn...	Feb. 16, 1924
31, 1925	APW PIERCE, THOMAS D. Rate Engr., 917 Illinois Bldg., Indianapolis, Ind.	Mar. 4, 1930
7, 1934	APW PILLAY, M. S. KUMARASWAMI. Civil & Hyd. Engr., Section Officer, Water Works, Trivandrum, South India	Mar. 15, 1930
17, 1931	W PINCUS, SOL. San. Engr., 15 W. 81st St., New York, N. Y.	Feb. 17, 1920
20, 1925	DW PIRNIE, MALCOLM. Cons. Engr., 25 W. 43rd St., New York, N. Y.	May 8, 1917
12, 1925	W PLAMONDON, ADRIEN, C.E. Engr. & Contractor, 30 St. James St., W., Montreal, Que., Canada	May 22, 1916
6, 1924	PLUMMER, WADE. Supt., Butte Water Co., Butte, Mont.	Dec. 15, 1925
24, 1923	POARCH, S. D. 134 S. 3rd St., Olean, N. Y.	Jan. 11, 1930
10, 1930	P POINTER, W. W. Gen. Supt., Munic. Water & Light Plant, Clarksdale, Miss.	Apr. 22, 1929
21, 1928	APW POLK, WESLEY W. Supt. & Chief Engr., Water Dept., Sheridan Rd. & Lincoln St., Evanston, Ill.	Mar. 10, 1926
31, 1930	P POOLE, GEORGE J. Supt. of Pumping Stations, Water Dept., 3855 Emerson Ave., N., Minneapolis, Minn.	June 17, 1930
7, 1917	W PORTER, D. P. Supt. of Water Works, 1305 E. 4th St., Pueblo, Colo.	Sept. 22, 1916
18, 1927	APW PORTER, F. B. Pres., Southwestern Laboratories, Box 1008, Fort Worth, Tex.	June 10, 1930
29, 1924	PORTER, FRED S. Gen. Mgr., Water Dept., 308 Public Utilities Bldg., Long Beach, Calif.	Oct. 29, 1932
4, 1913	PW PORZELIUS, A. F. Supt., City Water Co., Chattanooga, Tenn.	July 7, 1920
6, 1922	W POTTER, ALEXANDER. Cons. Engr., 50 Church St., New York, N. Y.	July 18, 1907
7, 1920	PW POTTER, J. M. 209 Dartmouth Ave., Swarthmore, Pa.	Nov. 10, 1933
8, 1907	W POTTS, CLYDE. Civil & San. Engr., 30 Church St., New York, N. Y.	July 10, 1906
6, 1922	POWELL, ALEXANDER C. 136 Grant St., Bangor, Me.	Mar. 12, 1910
7, 1920	W POWELL, SHEPPARD T. Cons. Chem. Engr., 330 N. Charles St., Baltimore, Md.	July 10, 1906
1, 1928	APW POWELL, WILLIAM G. City Mgr., City Bldg., Ashland, Ky.	Mar. 9, 1934
6, 1922	APW POWRIE, WM. G. Engr., Water Service, Union Station, Chicago, Ill.	Mar. 5, 1934
7, 1932	PW PRACY, GEO. W. Supt., Water Dept., 425 Mason St., San Francisco, Calif.	May 18, 1915
5, 1922	PW PRATT, ARTHUR H. Cons. Engr., 24 Commerce St., Newark, N. J.	Jan. 4, 1923
3, 1923	PRATT, CHARLES J. Supt., Water Dept., City Hall, Owen Sound, Ont., Canada	Oct. 22, 1924
3, 1924	W PRATT, GILBERT H. Div. Mgr., Wallace & Tiernan Co., Inc., Statler Bldg., Room 502, Boston, Mass.	June 5, 1916
1, 1928	APW PRAY, JOHN W. Supt. of Water Works, Fort Dodge, Iowa.	June 24, 1913
1, 1922	P PRENTICE, EDWARD H. City Engr., City Hall, Binghamton, N. Y.	Aug. 19, 1932
1, 1928	PRICE, WILL. Supt. of Water & San. Sewers, City Hall, Longmont, Colo.	Jan. 18, 1934
1, 1927	PRINDLE, GEORGE B. Supt. of Water Works, 374 Oakland Drive, Highland Park, Ill.	Mar. 25, 1924
1, 1930	APW PRINGLE, D. RHETT. Supt., Water & Light Dept., Thomasville, Ga.	Sept. 27, 1924
1, 1927	PRINGLE, J. T. Supt., Stamford Water Works, Stamford Township, Southend, Ont., Canada	Apr. 28, 1925
1, 1914	W PRIOR, JOHN C. Prof. of San. Engineering, Brown Hall, Ohio State University, Columbus, O.	Oct. 13, 1926
1, 1931	PW PRITCHARD, JOHN C. 5864 Cates Ave., St. Louis, Mo.	Feb. 8, 1926
1, 1921	PROCTOR, EDWARD M. Cons. Engr., 177 Inglewood Drive, Toronto 5, Ont., Canada	May 5, 1921

	Joined
APW PROCTOR, RALPH R. Field Engr., Dept. of Water & Power, 207 South Broadway, Los Angeles, Calif.	Sept. 30, 1931
PROKOFIEFF, S. T. Executive Engr., Drainage & Water Works, Gwalior, India.	Oct. 27, 1922
PW PROVOST, ANDREW J., JR. San. Expert & Hyd. Engr., 39-41 W. 38th St., New York, N. Y.	May 12, 1908
PURCELL, HUGH G. Mgr., Hugh G. Purcell Co., 304 Colman Bldg., Seattle, Wash.	Jan. 30, 1928
PW PURCELL, LEE T. Analyst, North Jersey District Water Sup- ply Commission, Wanaque, N. J.	Jan. 22, 1931
PUTNAM, EBEN F. Pres., Greenwich Water Co., 253 Green- wich Ave., Greenwich, Conn.	Dec. 8, 1927
W PUTNAM, JAMES W. Iron Works Mgr., John Lysaght, Ltd., Casilla Correo 329, Buenos Aires, Argentina.	June 10, 1930
APW QUIGLEY, LEWIS A. Supt., City Water Works, 2611 S. Adams St., Fort Worth, Tex.	June 6, 1927
APW QUILTY, PATRICK. Asst. Engr., Dept. of Water Supply, Gas & Electricity, 601 W. 163rd St., New York, N. Y.	May 20, 1930
QUIMBY, FRANK K. Construction Engr., Water Dept., City Hall, Racine, Wis.	July 29, 1930
W QUINN, JOHN J. Chemist, Water Dept., 126 W. Baxter Ave., Knoxville, Tenn.	May 20, 1930
W QUINNELL, FRED. Commissioner of Public Works, Box 684, Roundup, Mont.	Feb. 7, 1922
PW QUIRK, HAROLD E. Hyd. Engr., Dayton-Dowd Pump Co., 3807 Keokuk St., St. Louis, Mo.	Mar. 2, 1934
PW RAAB, FRANK. Chemist & Bacteriologist, Fridley Filtration Plant, Minneapolis, Minn.	Oct. 26, 1921
W RACE, JOSEPH. Devonshire Hospital, Buxton, England.	May 18, 1914
W RADCLIFFE, JOHN L. Chemist, Elizabethtown Water Co., Consolidated, 535 Trotter Lane, Elizabeth, N. J.	Feb. 19, 1920
PW RAFFETY, J. S. San. Engr. of Hamilton County, Court House, Room 549, Hamilton County Court House, O.	Oct. 13, 1931
PW RAINEY, CLARENCE M. Water Supt., 735 W. Bonneville St., Pocatello, Ida.	Nov. 15, 1927
AP RAINWATER, J. E. Supt., Water Works, Cedartown, Ga.	Feb. 20, 1931
RAMEY, H. P. Asst. Chief Engr., Sanitary District of Chi- cago, 910 S. Michigan Ave., Chicago, Ill.	June 6, 1927
W RAMIREZ, GERARD F. 253 W. 14th St., New York, N. Y.	June 20, 1934
PW RAMSEY, JOHN L. Supt., Water Works, Rocky Mount, Va.	July 3, 1934
RANDLETT, FRED M. Robert W. Hunt Co., 251 Kearny St., San Francisco, Calif.	June 16, 1920
P RANKIN, G. C. Box 1313, Tampa, Fla.	Feb. 23, 1932
RAPP, WILLIAM M. Supt., Construction & Distribution, Water Works, P. O. Box 584, Atlanta, Ga.	May 17, 1899
RATHER, C. P. Vice Pres., Alabama Water Service Co., American-Traders Bldg., Birmingham, Ala.	May 15, 1930
RATHERT, F. A. Supt. of Water Works, Junction City, Kans.	Oct. 9, 1928
APW RATLIFF, EMMETT M. Civil Engr., Box 522, Fayetteville, Ark.	Sept. 30, 1929
P READ, GEO. Meter & Service Supt., Dept. of Water & Power, Box 240, Arcade Annex, Los Angeles, Calif.	Sept. 30, 1929
PW READ, MILES H. Asst. Engr., Simplex Valve & Meter Co., 68th & Upland Sts., Philadelphia, Pa.	Apr. 30, 1930
APW REBSAMEN, LLOYD M. Mgr., City Water & Light Plant, Jones- boro, Ark.	Jan. 18, 1934
W REDFERN, W. BLAINE. James, Proctor & Redfern, 1004 Ex- change Life Bldg., 36 Toronto St., Toronto 2, Ont., Canada.	Nov. 12, 1919

Joined

		Joined
30, 1931	W REED, CLARENCE H. Asst. Chemist, Metropolitan Water Works, Framingham, Mass.	May 15, 1930
27, 1922	P REED, M. J. Sect., Diesel Engine Mfrs. Association, 2 W. 45th St., New York, N. Y.	May 8, 1930
12, 1908	APW REEDER, ARTHUR L. Engr., Designing Div., Bureau of Water, City Hall, Reading, Pa.	Nov. 30, 1926
30, 1928	P REICHARDT, H. G. Supt., City Water Dept., Watertown, Wis.	Oct. 27, 1931
22, 1931	REILLY, GEORGE W. Bellingham, Wash.	May 20, 1931
8, 1927	APW REINHARDT, HARRY. Vice-Pres., The Loveland Engineers, Inc., 485 California St., San Francisco, Calif.	Apr. 12, 1931
10, 1930	REINICKER, L. T. Delaware Valley Utilities Co., 1807 Packard Bldg., Philadelphia, Pa.	June 10, 1929
6, 1927	W REINKE, EDWARD A. Senior San. Engr., Bureau of San. Engineering, State Dept. of Public Health, 3093 Life Sciences Bldg., Berkeley, Calif.	Nov. 8, 1923
20, 1930	RELPH, O. S. Supt. of Water Works, San Jose, Calif.	Oct. 27, 1925
29, 1930	PW RENSHAW, WILLIAM C. Asst. Engr., Water Dept., 425 Mason St., San Francisco, Calif.	Nov. 15, 1933
20, 1930	PW RENTON, GEORGE F. Asst. Engr., Bradford Corporation Waterworks, 5 Leylands Ave., Heaton, Bradford, Yorkshire, England.	Feb. 10, 1931
7, 1922	APW REQUARDT, GUSTAV J. Whitman, Requardt & Smith, Engrs., West Biddle & Charles Sts., Baltimore, Md.	May 17, 1923
2, 1934	APW REYNOLDS, ABEL. Treas., New England Water, Light & Power Associates, 833 Hospital Trust Bldg., Providence, R. I.	July 20, 1929
6, 1921	W REYNOLDS, ALBERT H. Chemist, 1029 W. 35th St., Chicago, Ill.	Dec. 17, 1929
8, 1914	W REYNOLDS, LEON B. Prof. of Hyd. & San. Engineering, Box 1826, Stanford University, Calif.	Nov. 13, 1928
9, 1920	APW REYNOLDS, OTTO S. Water Works Engr., 6220 Harrison Ave., Kansas City, Mo.	Aug. 5, 1927
3, 1931	APW REYNOLDS, RALPH W. Supt., West Palm Beach Water Co., Drawer B-25, West Palm Beach, Fla.	Nov. 15, 1926
5, 1927	APW RHOADS, A. L. Supt., West Virginia Water Service Co., Bluefield, W. Va.	May 25, 1926
3, 1927	APW RHYNE, C. E. Supt. of Water Works, Gastonia, N. C.	Jan. 17, 1922
3, 1934	RHYNUS, C. P. Box 1973, Orlando, Fla.	May 14, 1912
3, 1934	AP RICE, HUGH B. Supt., Public Works, Box 775, Lexington, Va.	June 26, 1934
1920	APW RICE, P. D. Mgr., Sweetwater Water Corp., P. O. Box 1, National City, Calif.	Nov. 15, 1926
1932	PW RICHARDSON, CHARLES G. Sales Mgr., Builders Iron Foundry, Providence, R. I.	July 7, 1920
1899	W RICHARDSON, J. C. Chief Chemist, Filter Plant, Saginaw, Mich.	May 31, 1930
1930	AW RICKARD, GROVER E. Worcester, Otsego County, N. Y.	June 5, 1926
1928	W RIDDICK, THOMAS M. Instructor, Hyd. & San. Engineering, New York University, University Heights, Box 65, New York, N. Y.	Oct. 1, 1934
1929	W RIDENOUR, W. E. Chief Chemist, Bird, Archer Co., 4337 N. American St., Philadelphia, Pa.	Dec. 27, 1928
1929	W RIDER, JANE H. Director, Arizona State Laboratory, Box 4694, Tucson, Ariz.	Aug. 23, 1920
1930	RIDGELY, RAYMOND G. Supt., Pinellas Water Co., P. O. Box 2308, St. Petersburg, Fla.	Oct. 31, 1930
1934	P RIDGWAY, W. C. Supt., Water Works, Lebanon, Ind.	Feb. 15, 1930
1919	W RIEDEL, CARL M., C.E. Designing Engr., 8020 Paxton Ave., Chicago, Ill.	June 6, 1933
	APW RILLIET, JEAN L., JR. 3952A Sullivan Ave., St. Louis, Mo.	Oct. 9, 1931
	APW RINGNESS, HENRY. Supt. of Accounts, Peoria Water Works Co., 105 N. Monroe St., Peoria, Ill.	Sept. 8, 1919

	Joined
PW RIPPLE, OLIVER J. Supt., Marston Lake, North Side Filter plant, R. F. D. No. 2, Littleton, Colo.....	Jan. 31, 1930
RITCH, PAUL E. Junior Civil Engr., Los Angeles Dept. of Water & Power, Independence, Calif.....	Oct. 1, 1934
RITCHIE, EDGAR G. Engr. of Water Supply, Metropolitan Board of Works, Melbourne, Australia.....	Sept. 6, 1912
PW ROBBINS, FRANKLIN H. Designing Engr., Board of Water Supply, 346 Broadway, New York, N. Y.....	Apr. 22, 1930
ROBBINS, W. D. City Mgr., City Hall, Niagara Falls, N. Y.	Feb. 23, 1926
AP ROBERTS, ALFRED M. Wanakah Water Co., 259 Delaware Ave., Buffalo, N. Y.....	July 20, 1925
ROBERTS, JOHN S., JR. Borough Engr., Bristol, Pa.....	June 19, 1920
APW ROBINSON, DELBERT W. Water Works Engr., Texas Louisiana Power Co., Fort Worth, Tex.....	Apr. 23, 1927
AP ROBINSON, F. K. Mgr., Water Works, East Liverpool, O....	July 1, 1934
PW ROBINSON, J. ALBERT M. Cons. Engr., 228 N. La Salle St., Chicago, Ill.....	Oct. 27, 1931
ROBINSON, LEONARD C. Supt., Water & Sewer Dept., Concord, Mass.....	July 18, 1907
ROBINSON, WM. E. Water Works Engr., City Hall, Calgary, Alberta, Canada.....	Feb. 25, 1930
ROBLES, GONZALO, Ing. Banco Nacional Hipotecario Urbano Y de Obras Publicas, S. A., Ave. Madero 32, Mexico City, Mexico.....	June 6, 1927
PW ROCCA, AGOSTINO, DR. ING. Societa Finanziaria Industriale Italiana, Via Durini 9, Milano, Italy.....	Sept. 8, 1931
W ROCKWELL, WILLARD F. Cons. Engr., 400 N. Lexington Ave., Pittsburgh, Pa.....	Feb. 14, 1928
APW RODE, LOUIS W. Supt. of Meters, Water Dept., 16th & French Sts., Wilmington, Del.....	May 31, 1930
APW ROETMAN, EDMOND T. Chief Engr., Tygart Valley Homesteads, Inc., Elkins, W. Va.....	Feb. 16, 1934
APW ROGERS, M. W. Engr., Public Utility Commission, Box 413, Carleton Place, Ont., Canada.....	Mar. 16, 1927
ROME, ROBERT. Deputy City Engr., 1836 McDonald St., Vancouver, B. C., Canada.....	Dec. 9, 1930
PW ROMIG, C. O. Resident Mgr., Dennison Water Supply Co., Dennison, O.....	Oct. 23, 1917
APW ROOS, CHARLES M. Sect. & Supt., Cairo Water Co., Cairo, Ill.....	May 18, 1913
APW ROPER, ROSWELL M. Engr., Board of Water Commissioners, East Orange, N. J.....	May 10, 1919
ROQUET, LAURENT L. Mech. Engr., 1192 University St., Montreal, Que., Canada.....	Jan. 10, 1934
ROSE, DAN. Town Foreman, Box 95, Noranda, Que., Canada..	Apr. 25, 1934
PW ROSEN, MILTON. Commissioner of Public Works, St. Paul, Minn.....	Apr. 14, 1931
PW ROSENBERG, OSCAR V. Water Treatment Plant Operator, Dept. of Water & Power, 804 E. 42nd St., Los Angeles, Calif.....	Oct. 16, 1933
PW ROSENTHAL, HELMAN. Director, Dallas Laboratories, 2411 S. Harwood St., Dallas, Tex.....	June 3, 1918
ROSENTRETER, HERMAN. 316 Mt. Prospect Ave., Newark, N. J.....	Mar. 12, 1908
ROUTLEDGE, GEORGE G. Supt., Water Distribution Section, 332 St. Clair Ave., E., Toronto, Ont., Canada.....	Mar. 18, 1919
ROUX, MAURICE G. Managing Director, Bonna Pipe Co. of America, Inc., 40-13th St., Brooklyn, N. Y.....	May 25, 1933
ROWE, E. A. 543 Petroleum Securities Bldg., 714 W. 10th St., Los Angeles, Calif.....	Nov. 9, 1922

Joined

Joined

31, 1930

W ROWE, E. J. Supt., Water & Light Dept., Wellsville, N. Y. June 3, 1921

P ROWLEY, EVERETT C. Asst. Engr., Long Island Water Corp., 337 Merrick Road, Lynbrook, L. I., N. Y. Feb. 10, 1934

1, 1934

W RUCHHOFF, C. C. Prin. Bacteriologist, Sanitary District of Chicago, 845 S. Wabash Ave., Chicago, Ill. June 16, 1925

6, 1912

PW RUCKMAN, CHAS. L. Asst. Supt., Meter & Service Div., Dept. of Water & Power, Box 240, Arcade Annex, Los Angeles, Calif. Dec. 22, 1932

22, 1930

23, 1926

AP RUDD, WILLIAM C. Division of Engineering, Detroit Dept. of Water Supply, 8300 W. Warren Ave., East Dearborn, Mich. June 14, 1923

20, 1925

19, 1920

RUDDEROW, MAURICE B. Mgr., Merchantville-Pensauken Water Co., 13 W. Maple Ave., Merchantville, N. J. June 23, 1914

23, 1927

1, 1934

PW RUFF, CHARLES F. With Malcolm Pirnie, Cons. Engr., 25 W. 43rd St., New York, N. Y. July 15, 1929

27, 1931

APW RUGGLES, A. V. Asst. to Sect., American Water Works Association, 29 W. 39th St., New York, N. Y. Aug. 16, 1920

18, 1907

AP RUIZ, CARLOS B. Mgr., Torreon Water Works, Calle Rodriguez No. 10, Torreon, Coah., Mexico Feb. 21, 1933

25, 1930

P RUMBERGER, C. A. Supt., Citizens Water Service Co., 207 Spruce St., Philipsburg, Pa. Sept. 30, 1931

6, 1927

PW RUPARD, HOMER. Prin. Asst. Engr., Indianapolis Water Co., 113 Monument Circle, Indianapolis, Ind. Apr. 16, 1930

8, 1931

W RUPP, DANIEL H. Water Dept., City Hall, Topeka, Kans. Oct. 14, 1922

14, 1928

RUSSELL, ALEXANDER. Vice Pres., Rochester & Lake Ontario Water Service Corp., 440 Powers Bldg., Rochester, N. Y. Sept. 21, 1927

31, 1930

W RUSSELL, D. A. Chief Chemist, Youngstown Sheet & Tube Co., Youngstown, O. May 31, 1924

16, 1934

RUSSELL, J. P. Editor, "Engineering & Contract Record," 347 Adelaide St., W., Toronto, 2, Ont., Canada Jan. 31, 1934

16, 1927

RUSSELL, NORMAN F. S. Pres., United States Pipe & Foundry Co., Drawer 306, Burlington, N. J. Dec. 10, 1915

9, 1930

RUTLEDGE, E. A. Dist. Mgr., Rensselaer Valve Co., 743 Subway Terminal Bldg., Los Angeles, Calif. Oct. 31, 1929

3, 1917

RYLE, JOHN. Asst. Supt., Passaic Valley Water Commission, 156 Ellison St., Paterson, N. J. Dec. 3, 1919

8, 1913

W SAFFORD, ARTHUR T. Engr., Proprietors Locks & Canals, 66 Broadway, Lowell, Mass. Feb. 4, 1921

0, 1919

PW SALMON, ERNEST H. Supt. of Plants, 741 Main St., North Battleford, Sask., Canada Nov. 9, 1929

0, 1934

5, 1934

SALMOND, JAMES J. Mgr., "Canadian Engineer," 62 Church St., Toronto, Ont., Canada July 18, 1907

4, 1931

PW SAMPAIO, GERALDO F. San. Engr., Caixa Postal 1631, Rio de Janeiro, Brazil. May 31, 1930

5, 1933

SAMUEL, T. D., JR. Chief Engr. & Supt., Water Dept., City Hall, Kansas City, Mo. Oct. 5, 1928

1, 1918

W SANBORN, JAMES F. Cons. Engr., 30 Church St., New York, N. Y. Aug. 22, 1921

1, 1908

SANDERS, RALPH L. Designing Engr., Water Dept., 901 Argyle St., Chicago, Ill. May 23, 1933

1919

PW SANDERS, V. G. Civil Engr., Dept. of Water & Power, Box 240, Arcade Annex, Los Angeles, Calif. Nov. 25, 1931

1933

PW SANDERSON, A. U. Chief Engr. of Water Supply, Dept. of Works, City Hall, Toronto, Ont., Canada June 9, 1920

1922

APW SANDQUIST, EMIL. Birch & Sons Construction Co., Great Falls, Mont. Jan. 17, 1927

PW SARGENT, GEORGE H. City Engr., La Grange, Ga. Dec. 11, 1929

APW SAVILLE, CALEB M. Mgr. & Chief Engr., Water Works, 53 N. Beacon St., Hartford, Conn. Mar. 18, 1916

	Joined
APW SAVILLE, THORNDIKE. Prof. of Hyd. & San. Engineering, New York University, Box 65, University Heights, New York, N. Y.	Aug. 30, 1920
APW SAWYER, ROBERT W. Asst. Engr. with Malcolm Pirnie, 25 W. 43rd St., New York, N. Y.	Oct. 6, 1932
W SCARRITT, ELWOOD W. Chief Chemist, Elgin Softener Corp., 57 North St., Elgin, Ill.	Dec. 20, 1928
SCHARFF, MAURICE R. Cons. Engr., First National Bank Bldg., Pittsburgh, Pa.	Jan. 1, 1926
APW SCHAUM, ARTHUR H. 7350 Shaftesbury Ave., University City, Mo.	Apr. 9, 1930
PW SCHAUT, GEORGE G. Chief Chemist, Bureau of Water, Bel- mont Ave. & Ford Road, Philadelphia, Pa.	Oct. 23, 1922
APW SCHENK, CHAS. F. Foreman, Municipal Water Dept., City Hall, Lewiston, Ida.	June 18, 1934
SCHERER, FREDERICK G. Asst. Engr., Bureau of Water, City Hall, Newark, N. J.	Dec. 26, 1919
P SCHLICHT, JOHN C. Supt. of Pipe System, Hackensack Water Co., 624 Park Ave., Weehawken, N. J.	June 15, 1926
W SCHMIT, JOS. M. City Engr. & Water Works Supt., P. O. Box 931, Lewistown, Mont.	Apr. 10, 1926
PW SCHNABEL, WILLIAM R., C.E. Engr., Bureau of Water, 242 S. Madison St., Allentown, Pa.	Apr. 10, 1924
PW SCHNEIDER, H. J. Supt. of Filtration, 1746 Doty St., Oshkosh, Wis.	June 12, 1931
PW SCHNEIDER, WILLIAM H. Chemist in Charge, Filtration Plant, Fremont, O.	Oct. 31, 1930
SCHOEPFLE, O. F. Chemist, Filtration Plant, 908 Vine St., Sandusky, O.	May 26, 1930
SCHOLL, CHARLES E. Supt., Water & Light Plant, 408 N. 16th St., Newcastle, Ind.	Apr. 4, 1929
SCHROEDER, E. C. Mgr., Water Works Plant, 617 N. 10th St., Manitowoc, Wis.	Aug. 26, 1924
SCHUCK, H. W. Supt. of Water Dept., 804 Bayswater Ave., Burlingame, Calif.	June 6, 1927
SCHUMPERT, HOMER W. Supt., Water, Light & Sewer Depts., P. O. Box 333, Newberry, S. C.	Aug. 24, 1925
A SCHUNKE, G. B. Utility Accountant, 323 County City Bldg., Seattle, Wash.	Jan. 31, 1929
PW SCHWABE, WALTER P. Thompsonville Water Co., 15 Central St., Thompsonville, Conn.	Nov. 3, 1914
SCHWADA, J. P. City Engr., Milwaukee, Wis.	May 28, 1924
SCHWARTZ, M. H. Chief Engr., Vincennes Water Supply Co., 19 W. Scott St., Vincennes, Ind.	June 13, 1929
A SCHWARTZ, WILLIAM J. Chief Accountant, Hackensack Water Co., 624 Park Ave., Weehawken, N. J.	Aug. 9, 1932
PW SCHWARZ, EUGENE. Supt., City Water Dept., Rochester, Minn.	June 6, 1927
A SCHWIER, ELMER C. Auditor, Indianapolis Water Co., 113 Monument Circle, Indianapolis, Ind.	Dec. 29, 1924
SCOBEY, FRED C. Senior Irrigation Engr., Irrigation Div., Bureau of Agricultural Engineering, Box 180, Berkeley, Calif.	Jan. 1, 1932
SCOFIELD, C. L. Canadian Fire Underwriters Association, 524 Coristine Bldg., Montreal, Que., Canada.	Apr. 22, 1930
SCOTT, A. A. 514 Fifth Ave., Greensboro, N. C.	Jan. 11, 1930
APW SCOTT, ROSSITER S., M.E. 4 E. 10th St., New York, N. Y.	Mar. 4, 1922
W SCOTT, WALTER M. Chairman of Commissioners, Greater Winnipeg Water District, New Civic Offices, Winnipeg, Man., Canada.	Mar. 11, 1914

Joined

	W SCOTT, WARREN J. Dir., Bureau of San. Engineering, State Dept. of Health, Hartford, Conn.	Oct. 14, 1922
30, 1920	APW SCRIPTURE, D. W. Mgr., Monterey County Water Works, 601 Lighthouse Ave., Pacific Grove, Calif.	Sept. 30, 1930
6, 1932	SEABURY, GEORGE T. Sect., American Society of Civil Engineers, 33 W. 39th St., New York, N. Y.	June 17, 1930
20, 1928	W SEERY, FRANCIS J. Prof. of Hyd. Engineering, Cornell University, 504 University Ave., Ithaca, N. Y.	Nov. 3, 1919
1, 1926	SEIBERT, U. J. Chemist, Filter Plant, 729 Sixth Ave., N., St. Cloud, Minn.	Oct. 23, 1931
9, 1930	SELIGMAN, FELIX. Mgr., Water & Light Dept., 414 W. First St., Duluth, Minn.	June 11, 1924
23, 1922	SENIOR, SAMUEL P. Pres. & Engr., Bridgeport Hydraulic Co., Bridgeport, Conn.	July 10, 1906
8, 1934	W SENSEMAN, H. L. Supt., Water Dept., Box 604, Iron Mountain, Mich.	May 24, 1927
6, 1919	SETTE, F. J. Assoc. Prof. of San. Engineering, Virginia Polytechnic Institute, Blacksburg, Va.	July 12, 1934
5, 1926	W SHANEMAN, FRED C. Sales Agent, Tacoma Electrochemical Co., P. O. Box 1215, Tacoma, Wash.	Jan. 17, 1928
0, 1926	W SHANER, HARRY L. Commissioner of Public Works, City Hall, Winston Salem, N. C.	Nov. 13, 1928
0, 1924	PW SHANK, JOHN J. Chemist & Bacteriologist, Wayne Laboratories, 17 E. Main St., Waynesboro, Pa.	May 8, 1930
2, 1931	APW SHARON, JOHN J. Water Dept., 425 Mason St., San Francisco, Calif.	Feb. 10, 1920
1, 1930	W SHARP, A. S. Mgr. & Sect., Leadville Water Co., 719 Harrison Ave., Leadville, Colo.	Mar. 24, 1926
3, 1930	SHAW, ARTHUR L. Cons. Engr., Metcalf & Eddy, Cons. Engrs., 1300 Statler Bldg., Boston, Mass.	May 9, 1931
4, 1929	APW SHAW, FRANK R. San. Engr., U. S. Public Health Service, 816 New Post Office Bldg., Chicago, Ill.	June 29, 1928
3, 1924	AP SHAW, PERCY A. Engr. & Supt. of Water Works, Old Court House, Manchester, N. H.	June 6, 1934
5, 1927	SHAW, WALTER A. Member, Board of Supervising Engineers, 1509 Farwell Ave., Chicago, Ill.	July 10, 1906
4, 1925	PW SHAWVER, G. B. Supt., Plant Construction & Operation, Tennessee Electric Power Co., Chattanooga, Tenn.	Apr. 9, 1930
1, 1929	SHELDON, HORACE A. Water Commissioner, Port Jervis, N. Y.	Apr. 30, 1931
6, 1914	PW SHEPARD, GEORGE. Chief Engr., Dept. of Public Works, 234 Court House, St. Paul, Minn.	Apr. 6, 1933
3, 1924	SHERMAN, ARTHUR L. 3700 Massachusetts Ave., N. W., Washington, D. C.	Feb. 16, 1924
9, 1929	SHERMAN, CHARLES W. Cons. Engr., Metcalf & Eddy, Cons. Engrs., 1300 Statler Bldg., Boston, Mass.	May 14, 1914
9, 1932	PW SHERMAN, LE ROY K. Pres., Randolph-Perkins Co., 8 E. Huron St., Chicago, Ill.	Sept. 10, 1924
9, 1927	W SHIBLEY, KENNETH. 7th Floor, Textile Tower, Seattle, Wash.	Sept. 1, 1915
9, 1924	SHIELDS, W. S. Shields, Jordan & Roe, 8 S. Dearborn St., Chicago, Ill.	May 17, 1899
9, 1929	SHIFLETT, HERMAN L. Community Water Service Co., 100 William St., New York, N. Y.	May 31, 1930
9, 1932	PW SHNIDMAN, LOUIS. Laboratory Director & Chief Chemist, Rochester Gas & Electric Corp., 48 Smith St., Rochester, N. Y.	Mar. 5, 1929
9, 1930	APW SHOEMAKER, G. E. Gen. Mgr., Water Works, Waterloo, Iowa.	June 5, 1911
9, 1922	W SHOEMAKER, MILTON J. Chem. Engr., C. F. Burgess Laboratories, Inc., 1015 E. Washington Ave., Madison, Wis.	May 5, 1933
9, 1914	APW SHOEMAKER, WM. C. Asst. Mgr., Cairo Water Co., 1105 Washington Ave., Cairo, Ill.	Apr. 22, 1930

	Joined
P SHONERD, R. E. Asst. Chief Mech. Engr., 1006 Hall of Records, Los Angeles, Calif.	June 29, 1928
W SHOWELL, E. B., JR. Dupont-Rayon Co., Drawer B, Station B, Buffalo, N. Y.	Nov. 10, 1925
W SHULDENER, HENRY L. Pres. & Technical Director, Water Service Laboratories, Inc., 247 E. 56th St., New York, N. Y.	May 26, 1930
SHULL, ALBERT B. Water Treatment Plant Operator, Los Angeles Dept. of Water & Power, 1303 Gulf Ave., Wilmington, Calif.	Apr. 14, 1933
APW SHULL, J. W. Supt., Water Dept., North 13th St., Wheeling, W. Va.	Nov. 24, 1924
W SICKEL, H. B. ALLEN. Hazen, Ark.	July 22, 1927
APW SIEMS, V. BERNARD, C.E. 11 Broadway, New York, N. Y.	May 11, 1916
APW SIMMS, R. B. Supt., Water Works, Spartanburg, S. C.	May 24, 1922
PW SIMONTON, LEWIS R. Supt. of Filtration, 621 W. Poplar St., Griffin, Ga.	Apr. 18, 1934
P SINCLAIR, HAROLD. Sales Engr., Turbine Equipment Co., 75 West St., New York, N. Y.	Apr. 16, 1930
SIZER, WILLIAM D. Mgr., Manufacturing Division, Worthington Pump & Machinery Corp., Harrison, N. J.	June 29, 1933
W SKIDMORE, J. E. Mgr., Water Works, Cobourg, Ont., Canada.	Mar. 16, 1926
APW SKINKER, THOMAS J. Engr. in Charge of Distribution, 4600 McRee Ave., St. Louis, Mo.	July 31, 1924
SKINNER, ALFRED E. Western Mgr., The Pitometer Co., 5311 Kenmore Ave., Chicago, Ill.	Mar. 14, 1921
W SKINNER, HERVEY J. Pres., Skinner & Sherman, Inc., 246 Stuart St., Boston, Mass.	Apr. 10, 1926
SKINNER, JOHN F., C.E. Cons. Engr., 21 Arnold Park, Rochester, N. Y.	May 11, 1927
PW SLANE, NORMAN F. Meter & Service Inspector, Dept. of Water & Power, 3623 Arlington Ave., Los Angeles, Calif.	Oct. 28, 1933
W SLATER, E. O. Smith-Emery Co., 920 Santee St., Los Angeles, Calif.	Apr. 11, 1922
PW SLATER, L. N. Vice Pres., Western Pipe & Steel Co., 5717 Santa Fe Ave., Los Angeles, Calif.	Sept. 22, 1931
PW SLEEPER, BENJAMIN A. Civil Engr. & Surveyor, 501 Cooper St., Camden, N. J.	Dec. 9, 1930
PW SMALLEY, JAMES D. Supt., Water Dept., City Hall, Hayward, Calif.	Aug. 29, 1923
W SMALSHAF, A. J. Water Works, Columbus, Ga.	Dec. 26, 1916
APW SMEDBERG, C. W. 315 Woodbine St., Greensboro, N. C.	Dec. 11, 1922
W SMITH, BENJ. L. Whitman, Requardt & Smith, Engrs., West Biddle & Charles Sts., Baltimore, Md.	June 10, 1930
PW SMITH, CHESTER A. Cons. Engr., Burns & McDonnell Engineering Co., 107 W. Linwood Blvd., Kansas City, Mo.	Sept. 27, 1924
APW SMITH, E. VERNON. Supt. of Public Works, Park Ridge, N. J.	Dec. 9, 1930
PW SMITH, ELROY G. Cons. Engr., 313 Herald Bldg., Augusta, Ga.	June 16, 1920
AP SMITH, FRANK C. Supt., Taxpayers Municipal Water Works, Creston, Iowa.	Jan. 27, 1932
W SMITH, J. F. Sales Mgr., Great Western Electro-Chemical Co., 9 Main St., San Francisco, Calif.	Dec. 11, 1931
APW SMITH, LEON A. Supt. of Water Works, City Hall, Madison, Wis.	May 17, 1916
SMITH, M. C. Engr. in Charge, Bureau of Water & Electricity, Room 109, City Hall, Richmond, Va.	May 12, 1925
APW SMITH, MELOY. Supt. of Water, 43 City Hall, Rochester, N. Y.	Mar. 30, 1934
W SMITH, MILTON P. Supt., Parks & Public Property, Sioux City, Iowa.	Apr. 23, 1924

	Joined
PW SMITH, DR. O. M. Chemistry Dept., Oklahoma Agricultural & Mechanical College, Stillwater, Okla.....	Feb. 24, 1928
SMITH, P. A. Treas., A. P. Smith Mfg. Co., 66 Stanley Rd., South Orange, N. J.....	May 31, 1927
APW SMITH, R. J. Mgr. & Sect.-Treas., Perth Public Utilities Commission, Perth, Ont., Canada.....	June 10, 1911
SMITH, ROBERT L. Water Supt., Montrose, Colo.....	Oct. 27, 1931
APW SMITH, ROBERT T. Wallace & Tiernan Co., Inc., 414 Flour Exchange Bldg., Minneapolis, Minn.....	July 18, 1930
PW SMITH, SAMUEL B. Water Supt., Livingston, Tenn.....	Apr. 20, 1932
APW SMITH, W. AUSTIN. Cons. Engr., P. O. Box 1048, Jacksonville, Fla.....	Dec. 22, 1926
APW SMOUSE, JOHN P., JR. Route 6, St. Joseph, Mo.....	June 12, 1931
W SNEAD, S. C. Kimbaltan Lime Co., Inc., Shawsville, Va.....	Jan. 1, 1934
SNEDEKER, L. LEVERN. City Chemist, 150 S. McKenzie St., Adrian, Mich.....	May 20, 1930
PW SNIDOW, HERMAN W. Asst. Engr., State Board of Health, Richmond, Va.....	June 17, 1926
SNOW, BARTON S. Pres. & Hyd. Engr., T. W. Snow Construction Co., 332 S. La Salle St., Chicago, Ill.....	June 10, 1930
SNYDER, HAROLD J. Civil Engr., P. O. Box 266, Keyser, W. Va.....	June 30, 1930
AW SNYDER, M. K. Prof. of San. Engineering, State College of Washington, Pullman, Wash.....	Nov. 30, 1928
SOCHA, MAX K. Civil Engr., Dept. of Water & Power, Box 240, Arcade Annex, Los Angeles, Calif.....	Feb. 20, 1933
AP SODERSTRUM, J. P. City Mgr., City Hall, Grand Junction, Colo.....	Nov. 15, 1929
SOEHREN, W. L. Supt., Dallas Water Co., Dallas, Ore.....	Dec. 31, 1930
PW SOLOMON, GABRIEL R. Pres., Solomon, Norcross & Keis, 257 Broadway, Troy, N. Y.....	Nov. 18, 1925
SONDEN, RAGNAR F. M. Civil Engr., Waterworks of Boras, Boras, Sweden.....	May 20, 1930
PW SONDEREGGER, A. L. Cons. Engr., 925 Central Bldg., Los Angeles, Calif.....	Mar. 23, 1933
P SORELLE, DONALD. Supt. of Water Works, Acushnet, Mass.....	Apr. 22, 1930
W SPALDING, GEO. R. Asst. Supt. of Filtration & Sanitation, Hackensack Water Co., New Milford, N. J.....	June 17, 1926
PW SPARKS, HARRY H. Dept. of Water & Power, 207 South Broadway, Los Angeles, Calif.....	Sept. 8, 1931
GW SPAULDING, CHARLES H. Supt. of Water Purification, Dept. of Water, Light & Power, Springfield, Ill.....	July 29, 1924
SPEAR, WALTER E. Acting Chief Engr., Board of Water Supply, 346 Broadway, 11th Floor, New York, N. Y.....	Jan. 8, 1915
W SPELLER, FRANK N. Metallurgical Engr., 1802 Frick Bldg., Pittsburgh, Pa.....	June 10, 1920
SPENCER, C. A. Supt., Mountain Water Supply Co., 502 First National Bank Bldg., Greensburg, Pa.....	Oct. 10, 1919
W SPERRY, WALTER A. Chem. Engr., 733 S. Fourth St., Aurora, Ill.....	Dec. 5, 1914
SPITZNAGLE, JOSEPH. Supt. of Water & Light, Box 643, Gilbert, Minn.....	June 6, 1927
W STALBIRD, JAMES A. Enfield, Mass.....	Apr. 9, 1925
W STANFIELD, A. C., C.E. Pana, Ill.....	Dec. 24, 1914
PW STANLEY, C. M. Cons. Engr., Young & Stanley, Inc., 211 Iowa Ave., Muscatine, Iowa.....	Sept. 20, 1932
PW STANLEY, WILLIAM E. Greeley & Hansen, Cons. Engr., 6 N. Michigan Ave., Chicago, Ill.....	Nov. 9, 1922
P STAPLETON, E. J. Mgr., Public Utilities Commission, Collingwood, Ont., Canada.....	Mar. 13, 1934

	Joined
W STARKE, WILLIAM. Supt., Munic. Water Dept., 416-3rd St., City Hall, San Bernardino, Calif.	Nov. 15, 1926
APW STARTZELL, R. C. Supt. of Water Works, 224 W. Mahoning St., Punxsutawney, Pa.	Dec. 20, 1927
PW STAUB, WILLIAM S. Supt., East Rainelle Water Co., East Rainelle, W. Va.	July 31, 1934
PW STAUFF, PAUL V. City Chemist, Park Hotel, Eveleth, Minn.	Jan. 18, 1934
STAVA, WILLIAM. Asst. Engr., Hyd. Div., California Railroad Commission, 2927 Regent St., Berkeley, Calif.	May 17, 1927
PW STEAD, FRANK M. San. Engr., 678 S. Ferris Ave., Los Angeles, Calif.	Sept. 8, 1931
STEARNS, HARRINGTON P. Long Island Water Corp., 337 Merrick Road, Lynbrook, L. I., N. Y.	Jan. 22, 1914
AP STEELMAN, ELMER S. Mgr., Ocean City Water Service Co., 10th St. & West Ave., Ocean City, N. J.	July 29, 1929
W STEINHAEUER, E. Local Mgr., Redding District, California Water Service Co., Box No. 233, Redding, Calif.	May 26, 1927
PW STEPHENSON, FRANK H. Civil Engr., 10 N. Fulton Ave., Mt. Vernon, N. Y.	May 24, 1920
STERN, SOLLIS E. Supt., Frankfort Water Works Co., Frankfort, Ind.	May 17, 1933
STEROSEY, JOSEPH. Supt., Water Dept., 909 Oak St., Port Huron, Mich.	May 28, 1924
STEVENS, JAMES S. Supt. of Yards & Shops, East Bay Municipal Utility District, 2127 Adeline St., Oakland, Calif.	May 23, 1933
W STEVENS, STANLEY. Aluminium, II, Ltd., Bush House, Aldwych, London, W. C. 2, England.	Mar. 25, 1932
PW STEVENSON, RALPH A. Cons. Chemist, 514 E. 8th St., Los Angeles, Calif.	Sept. 14, 1927
W STEWART, C. E. Supt., Muncie Water Works Co., 316 S. Mulberry St., Muncie, Ind.	Jan. 5, 1925
APW STEWART, HAROLD B. Engr., Associated Factory Mutual Fire Insurance Cos., 184 High St., Boston, Mass.	June 22, 1932
P STEWART, MARION G. Supt., Water Works, Natchez, Miss.	Feb. 29, 1932
STEWART, NEIL G. Asst. Supt., Filtration Plant, 62 Williamson Road, Toronto, Ont., Canada.	May 23, 1933
PW STEWART, ROY N. P. O. Box 413, Miles City, Mont.	Apr. 11, 1932
STEWART, SPENCER W. Pres., Ambursen Construction Co., Inc., 295 Madison Ave., New York, N. Y.	Feb. 4, 1921
W STIMMEL, R. M. Chief Chemist, New York, Chicago & St. Louis R. R., Lima, O.	Apr. 22, 1930
P STOBER, A. W. Neptune Meter Co., 1519 N. W. Johnson St., Portland, Ore.	July 1, 1934
APW STOCKER, LESLIE W. Civil Engr., Public Utilities Commission, 425 Mason St., San Francisco, Calif.	Jan. 31, 1930
W STOCKWELL, HENRY P., JR. Chem. Engr., Water Purification Plant, Ottawa, Ont., Canada.	Jan. 1, 1933
STOLDT, G. F. Supt., City Power & Water Plant, Jacksonville, Ill.	Dec. 16, 1922
P STOLP, AMER C. Mgr., California Water Service Co., Marysville, Calif.	Nov. 6, 1933
PW STOMPLER, OTTO F. Supt., Langhorne Spring Water Co., Langhorne, Pa.	Jan. 6, 1926
AP STONE, ORMOND A. Cons. Civil Engr., 888 El Campo Drive, Pasadena, Calif.	Jan. 2, 1924
W STOREY, GILBERT C. Sect.-Mgr., Water Commissioners, City Hall, Windsor, Ont., Canada.	Feb. 4, 1920
STORMS, TOM. Salesman, R. D. Wood Co., 7942 Essex Ave., Chicago, Ill.	Mar. 2, 1934

	Joined
AW STORRIE, WILLIAM. Cons. Engr., Charles-Bay Bldg., 1130 Bay St., Toronto, 5, Ont., Canada.....	Mar. 11, 1915
PW STORRS, H. A. Chief Inspector, East Bay Municipal Utility District, 512 16th St., Oakland, Calif.....	Apr. 9, 1930
APW STOUT, T. A. Mgr., Catlettsburg, Kenova & Ceredo Water Co., Box 453, Catlettsburg, Ky.....	Oct. 13, 1932
PW STOVER, FREDERICK H. Chemist & Bacteriologist, Crescent Hill Filter, Louisville Water Co., Louisville, Ky.....	June 3, 1912
PW STRACHAN, DOUGLAS G. 226, Fambridge Road, Maldon, Essex, England.....	Jan. 26, 1934
APW STRADLING, F. P. Supt., Kokomo Water Works Co., P. O. Box 369, Kokomo, Ind.....	Dec. 29, 1924
APW STRANGE, E. L. Mgr., City Water Works, Corvallis, Ore.....	Nov. 30, 1928
STRASSER, J. J. Branch Mgr., Hersey Mfg. Co., 844 Rush St., Chicago, Ill.....	Apr. 23, 1934
PW STRICKLAND, G. HUDSON. Supt., Filtration Div., Essex Border Utilities Commission, Canada Bldg., Windsor, Ont., Canada.....	Mar. 27, 1929
W STROCKBINE, WALTER. Chemist, Bureau of Water, 25 N. 11th St., Reading, Pa.....	June 6, 1927
W STROHMAYER, JOSEPH S. Asst. Civil Engr., Water Dept., 5007 Cerdelia Ave., Baltimore, Md.....	May 11, 1922
STROMQUIST, W. G. Tennessee Valley Authority, Sprinkle Bldg., Knoxville, Tenn.....	May 2, 1932
PW STUART, FRED E. Research Engr., Industrial Chemical Sales Co., Inc., 230 Park Ave., New York, N. Y.....	Oct. 3, 1931
P STURGEON, GEORGE B. Maintenance Engr., Mokelumne Div., East Bay Municipal Utility District, P. O. Box 511, Lafayette, Calif.....	Aug. 24, 1933
SUDLOW, HARRY. Supt. of Water Works, Aiken, S. C.....	Apr. 22, 1930
PW SUTER, MAX. Civil Engr., 401 N. Race St., Urbana, Ill.....	May 25, 1933
W SUTER, RUSSELL. Executive Engr., Water Power & Control Commission, Albany, N. Y.....	Oct. 9, 1914
SUTHERLAND, IAN M., M.C.E. Engineering Draftsman, M. M. B. W., 110 Spencer St., Melbourne, Australia.....	June 16, 1920
SUTHERLAND, OSCAR. Asst. Supt., Water Dept., Sioux City, Iowa.....	June 6, 1927
SWAB, BERNAL H. Resident Engr., 713 First Ave., Altoona, Pa.....	Mar. 31, 1930
SWANSON, H. E. Supt., Water & Light Dept., Jacksonville, Ill.....	June 6, 1927
SWANSON, MELVIN O. 138 Ellis Ave., Jamestown, N. Y.....	Oct. 16, 1933
PW SWARTZ, MARTIN. Supt., Water & Light Commission, Greenville, N. C.....	Dec. 10, 1924
W SWEET, E. O. Birmingham Water Works Co., Birmingham, Ala.....	May 19, 1919
PW SWITZER, JOHN A. Cons. Engr., Prof. of Hyd. & San. Engineering, University of Tennessee, Knoxville, Tenn.....	May 10, 1915
PW SYBRANDT, JOHN L. Western Sales Mgr., Ludlow Valve Mfg. Co., 1564 Builders Bldg., Chicago, Ill.....	Apr. 23, 1934
PW SYMONS, JOHN Q. Foreman Operator, 2082 Main St., San Diego, Calif.....	Oct. 20, 1926
PW SYMONS, M. M. Chief Engr., Inter-state Water Co., Lock Box 803, Danville, Ill.....	Feb. 8, 1915
TABER, GEORGE A. Cons. Engr., 73 Cornhill, Boston, Mass.....	June 3, 1912
PW TANTER, F. S. Cons. Engr., Parsons, Klapp, Brinckerhoff & Douglas, Cons. Engrs., 142 Maiden Lane, New York, N. Y.....	Oct. 4, 1919
TAIT, ROBERT S. Supt. of Water, 14 California St., Santa Cruz, Calif.....	Oct. 27, 1925

	TAIT, WM. Supt. of Water Works, Picton, Ont., Canada.....	Joined Apr. 25, 1934
PW	TAKEUCHI, R. Hirata, Ashiya, Seido-Mura, Hyogo-Ken, Japan.....	Dec. 20, 1927
P	TALBOT, EARLE. Vice Pres., Hackensack Water Co., Box F, Weehawken, N. J.....	May 1, 1920
	TALLANT, LEE H. Water Supt., Estes Park, Colo.....	Apr. 22, 1930
APW	TARBELL, W. P. City Engr. & Supt. of Water Works, P. O. Box 185, Fargo, N. D.....	Feb. 17, 1928
P	TATNALL, GEORGE. Hyd. Engr., National Board of Fire Underwriters, 222 W. Adams St., Chicago, Ill.....	Feb. 15, 1930
	TAY, SAMUEL W. San. Engr., Territorial Board of Health, Hawaii, 2413 Lower Manoa Road, Honolulu, T. H.....	July 14, 1920
	TAYLOR, ARTHUR. Cons. Engr., 714 W. 10th St., Los Angeles, Calif.....	July 31, 1924
P	TAYLOR, D. R. Supt., Roanoke Water Works Co., 20 Salem Ave., E., Roanoke, Va.....	Sept. 19, 1933
W	TAYLOR, GEO. R. San. Chemist, 135 Jefferson Ave., Scranton, Pa.....	May 11, 1908
	TAYLOR, HENRY R. Filtration Supt., East Bay Municipal Utility District, 714 Arbor Drive, San Leandro, Calif.....	July 28, 1933
AP	TAYLOR, STEPHEN H. Supt., Water Works, 312 Municipal Bldg., New Bedford, Mass.....	June 3, 1919
PW	TAYLOR, WARREN C. Assoc. Prof. of Civil Engineering, Union College, Schenectady, N. Y.....	Oct. 31, 1924
APW	TEMPLE, LT. COL. F. C., C.I.E. Earthquake Relief Engr., E. I. Ry., Patna, India.....	Dec. 31, 1929
W	TENNY, M. K. Chemist, Water Works, 10th & Locust Sts., Des Moines, Iowa.....	Feb. 17, 1927
	THACKER, E. H. Asst. Supt., Meter & Service Dept., Water Distribution Div., Dept. of Water & Power, 468 Ducommun St., Los Angeles, Calif.....	Oct. 31, 1929
P	THANE, H. S. Supt., Water Dept., Missoula Div., Montana Power Co., Missoula, Mont.....	Apr. 30, 1926
P	THATCHER, CHAS. E. Mgr., Commercial Div., East Bay Municipal Utility District, 512-16th St., Oakland, Calif.....	May 31, 1933
APW	THEOBALD, JEROME J. Commercial Engr., Westchester Lighting Co., 9 S. First Ave., Mount Vernon, N. Y.....	Mar. 19, 1934
	THIESSEN, FRANK C. Engineering Dept., Railroad Commission, Madison, Wis.....	Oct. 7, 1924
	THOMAS, DAVID S. Inspecting Engr., Board of Fire Underwriters of the Pacific, 1106 Second Ave., N., Great Falls, Mont.....	Feb. 7, 1927
	THOMAS, EDGAR. Supt., Water Dept., Box 205, Yreka, Calif.....	June 6, 1927
APW	THOMAS, FRANKLIN. Professor of Civil Engineering, California Institute of Technology, Pasadena, Calif.....	Mar. 31, 1930
	THOMAS, NORTON A. Chemist & Bacteriologist, 905 Summit Ave., Milwaukee, Wis.....	May 8, 1930
PW	THOMPSON, DAVID G. Water Resources Branch, U. S. Geological Survey, Washington, D. C.....	Sept. 24, 1924
	THOMPSON, E. W. Northwestern Mgr., Neptune Meter Co., 525 Johnson St., Portland, Ore.....	Dec. 20, 1927
	THOMPSON, H. E. Supt. of Filtration, University of North Carolina, Chapel Hill, N. C.....	Dec. 21, 1933
	THOMPSON, JOHN D. Hotel Onondaga, Syracuse, N. Y.....	Oct. 31, 1929
APW	THOMPSON, LEONARD N. Gen. Supt. & Engr., Water Dept., St. Paul, Minn.....	Apr. 29, 1929
W	THOMPSON, RUDOLPH E. Asst. Chemist, Filtration Plant, 445 Parkside Drive, Toronto, 3, Ont., Canada.....	Mar. 16, 1922
PW	THORNE, R. M. Water Supt. & City Engr., City Hall, Renton, Wash.....	Apr. 28, 1932

		Joined
25, 1934	W THUMA, R. A. Supt., Filter Plant, Water Dept., R. F. D. No. 4, Dayton's Bluff P. O., St. Paul, Minn.....	Mar. 13, 1925
20, 1927	W TIEDEMAN, WALTER V. D. Asst. Sanitarian, Div. of Sanitation, State Dept. of Health, Elmsmere, N. Y.....	Oct. 16, 1925
1, 1920 22, 1930	TIMANUS, C. S. Burns & McDonnell Engineering Co., 107 W. Linwood Blvd., Kansas City, Mo.....	May 29, 1931
17, 1925	TIMONOFF, Prof. W. E., Ligovka No. 44, Kv. 600, Leningrad, U. S. S. R.....	Jan. 1, 1921 Feb. 26, 1934
15, 1930	AP TITCHENER, F. Supt., Water Board, Cortland, N. Y.....	Jan. 1, 1932
14, 1920	TOBIN, L. P. Supt. & Treas., Munic. Water & Light Dept., Camden, S. C.....	Apr. 30, 1934
31, 1924	TODD, ARTHUR R. Chemist, Water Dept., Warwood, Wheeling, W. Va.....	Aug. 1, 1923
19, 1933	TOLLES, FRANK C. Civil & San. Engr., 1149 Leader—News Bldg., Cleveland, O.....	July 14, 1887 Apr. 4, 1924
11, 1908	TOMLINSON, SAM. % Midland Bank, Ltd., Grange-Over-Sands, Lancashire, England.....	Aug. 28, 1928
28, 1933	W TOMS, R. C. Mgr., Marion Water Co., Marion, Iowa.....	Dec. 30, 1929
3, 1919	TONNEY, FRED O. Director of Laboratories & Research, Dept. of Health, 712 City Hall, Chicago, Ill.....	June 6, 1934
31, 1924	PW TOWNE, W. W. Director, Div. of San. Engineering, State Board of Health, Capitol Annex, Pierre, S. D.....	Apr. 14, 1933
31, 1929	P TOWNLEY, D. H. Engr., Elizabethtown Water Co., Consolidated, 22 W. Jersey St., Elizabeth, N. J.....	Nov. 18, 1925
17, 1927	PW TOWNSEND, FRED W. Water Treatment Plant Operator, Los Angeles Dept. of Water & Power, 902 Marine Ave., Wilmington, Calif.....	May 23, 1933
31, 1929	TRAUGER, GEORGE W. Supt., Lindsay Strathmore Irrigation District, Lindsay, Calif.....	July 20, 1917 June 9, 1911
10, 1926	TRAVER, LESLIE J. Master Mechanic, East Bay Municipal Utility District, 2127 Adeline St., Oakland, Calif.....	Nov. 19, 1927
1, 1933	TRAVIS, F. M. Pres., Torrington Water Co., P. O. Box 76, Torrington, Conn.....	Mar. 28, 1929
9, 1934	W TRAX, E. C. Chemist, Filtration Plant, McKeesport, Pa.....	Aug. 28, 1922
7, 1924	W TRICE, M. F. Asst. Engr., State Board of Health, Raleigh, N. C.....	Dec. 26, 1933
7, 1927	TROWBRIDGE, CHARLES E. American Water Works & Electric Co., 50 Broad St., New York, N. Y.....	Dec. 27, 1926
6, 1927	TRUE, ALBERT O. San. Engr., Denim Branch, Proximity Mfg. Co., Greensboro, N. C.....	June 18, 1934
1, 1930	APW TRUEBLOOD, V. B. Supt., Municipal Water Plant, Oskaloosa, Iowa.....	Sept. 30, 1932
3, 1930	W TRUMAN, CHESTER A. Supt., Northfield Land & Water Co., 3011 N. Tejon St., Colorado Springs, Colo.....	May 9, 1931
4, 1924	APW TURNBULL, R. R. Clerk, Munic. Water Dept., City Hall, Lewiston, Ida.....	Nov. 19, 1927
1, 1927	APW TURNER, HOMER G. Director, Research for Anthracite Institute, Mineral Industries Bldg., State College, Pa.....	July 10, 1916
1, 1933	PW TURNER, W. D. Prof. of Chem. Engineering, Columbia University, New York, N. Y.....	Feb. 15, 1930
1, 1929	PW TURRE, GEORGE J. Chief Chemist, Board of Water Commissioners, Box 629, Denver, Colo.....	May 7, 1934
1, 1922	W TUTTLE, ARTHUR S. Cons. Engr., 350 Madison Ave., New York, N. Y.....	Feb. 10, 1931
1, 1932	APW TVARGOSKY, PAUL A. Mgr., City Water Works, Vicksburg, Miss.....	
	TWIGGS, JOHN D. Asst. City Engr. & Supt. of Water Works, Augusta, Ga.....	
	PW TYLER, RICHARD G. Dean, College of Engineering, University of Washington, Seattle, Wash.....	

	Joined
TYNER, E. S. Supt. of Water Works, Plant City, Fla.....	Apr. 22, 1929
P ULRICH, A. A. Mgr., Massillon Div., Ohio Water Service Co., 50 Charles Ave., S. E., Massillon, O.....	June 12, 1931
W ULRICH, BERNARD L. Supt. of Water Works, Manhattan, Kans.....	Feb. 20, 1922
PW URBAIN, O. M. Director, Urbain Laboratories, 12 N. Third St., Columbus, O.....	Oct. 31, 1929
URUETA, EDUARDO F. Chemist & Filter Operator, Apto. 186, Barranquilla, Colombia.....	Sept. 30, 1929
PW VALLAS, BRYSON. Gen. Supt., Sewerage & Water Board, New Orleans, La.....	May 29, 1931
W VAN ARNUM, WILLIAM I. Supt. of Filtration, City Water Dept., 402 Glenwood Ave., Youngstown, O.....	Feb. 7, 1922
PW VAN BENSCHOTEN, JAY. Mech. & Water Works Engr., 32 Front St., W., Toronto, Ont., Canada.....	June 10, 1923
PW VAN CAMP, PAUL M. Civil Engr., Patch Bldg., Southern Pines, N. C.....	Nov. 25, 1931
APW VAN DEN BERG, C., JR. West Virginia Water Service Co., Charleston, W. Va.....	Apr. 23, 1927
PW VAN DEUSEN, E. J. Supt., Water Works, 21 Pearl St., Malone, N. Y.....	Feb. 14, 1925
PW VAN GIESEN, IRA D. Electrolysis Engr., Dept. of Water & Power, Box 240, Arcade Station, Los Angeles, Calif.....	Aug. 31, 1931
VAN GILDER, L. Engr. & Supt., Water Dept., City Hall, Atlantic City, N. J.....	July 10, 1906
VAN HECKE, CHAS. E. Supt., City Water Dept., Stevens Point, Wis.....	June 10, 1930
APW VAN LIEW, WM. M. Water Supt., Okanogan, Wash.....	Dec. 26, 1928
PW VAN LOAN, SETH M. Deputy Chief, Bureau of Water, 709 City Hall, Philadelphia, Pa.....	May 12, 1914
PW VAN METER, ROY O. Chief Filter Plant Operator, Los Angeles Dept. of Water & Power, 1025 McFarland St., Wilming- ton, Calif.....	Oct. 6, 1932
PW VAN PATTTER, HUGH S. Hyd. Engr., Dominion Engineering Works, Ltd., Montreal, Que., Canada.....	Apr. 4, 1932
A VAN SCIVER, HARRY B. Controller, Water Dept., 10th & King Sts., Wilmington, Del.....	May 31, 1930
APW VAUGHN, W. H. Water Supt., Fort Smith, Ark.....	June 6, 1927
VEALE, F. J. Supt. of Water Works, Hamilton, Ont., Canada..	Apr. 10, 1931
PW VEATCH, N. T., JR. Cons. Engr., Black & Veatch, Cons. Engrs., 701-5 Mutual Bldg., Kansas City, Mo.....	Dec. 16, 1915
VERMETTE, NARCISSE J. A. City Mgr., Shawinigan Falls, Que., Canada.....	Feb. 7, 1927
W VERMEULE, CORNELIUS C., C.E. 38 Park Row, New York, N. Y.....	June 8, 1909
VERSLUIS, JAS. J. Construction Engr., 403 City Hall, Chi- cago, Ill.....	June 5, 1926
P VERTEFEUILLE, JOSEPH A. Borough Engr., Dept. of Water Supply, Gas & Electricity of New York City, Municipal Bldg., Brooklyn, N. Y.....	May 16, 1916
AW VEST, W. E. Supt. of Water Works, Charlotte, N. C.....	May 3, 1911
VILLA-ACOSTA, ALFONSO. Civil Engr., 9a Calle de la Rosa 213, Mexico City, Mexico.....	Apr. 9, 1930
W VILLARUZ, PRIMO A. Asst. San. Engr., California Water Service Co., 829 N. Monroe St., Stockton, Calif.....	Feb. 23, 1932
VOJCSIK, LIPOT, C.E. Boraros Ter 6.IV.1., Budapest IX, Hungary.....	July 19, 1926
APW VOLK, KENNETH Q. 176 N. Highland Ave., Los Angeles, Calif.....	Oct. 18, 1926

	Joined
APW VOLLMAR, OTTO. Director, Dresden Water Works, Brockhausstrasse 3, Dresden, N. 8, Germany.....	Mar. 13, 1925
APW VON GREYERZ, WALO, C.E. Major, Royal Swedish Corps Engrs., Humlegardsgatan, 29, Stockholm, Sweden.....	July 23, 1920
VROOMAN, MORRELL. Cons. Civil Engr., Gloversville, N. Y....	June 24, 1913
P VROOMAN, W. S. Mgr., Commonwealth Public Service Co., Deer Lodge, Mont.....	Sept. 8, 1931
APW WACHTER, R. E. Asst. Engr., Missouri Pacific Ry., 1200 Missouri Pacific Bldg., St. Louis, Mo.....	Jan. 1, 1934
WADDINGTON, ARTHUR H. Chemist & Bacteriologist, 23 Torver Road, Harrow, Middlesex, England.....	June 16, 1934
W WADE, JEPETH A. California Water Service Co., Federal Reserve Bank Bldg., San Francisco, Calif.....	May 29, 1931
WAGNER, A. H. Supt., Public Water Works Dist. No. 2, 119 E. Abriendo Ave., Pueblo, Colo.....	Mar. 10, 1928
W WAGNER, C. F. Engr., Oregon Insurance Rating Bureau, P. O. Box 745, Portland, Ore.....	Nov. 30, 1925
W WAGNER, EDWIN B. Supt. of Water Works, Downingtown, Pa.....	Apr. 22, 1921
APW WAGNER, RICHARD F. Supt. & Engr., Dept. of Water, Lynchburg, Va.....	Nov. 3, 1919
APW WALKER, CHARLES L. Prof. of San. Engineering, Cornell University, Ithaca, N. Y.....	May 8, 1930
AP WALKER, EDWARD L. Asst. Hyd. Engr., Public Service Commission, 80 Centre St., New York, N. Y.....	Jan. 1, 1934
W WALKER, ELTON D. Prof. of Hyd. & San. Engineering, Pennsylvania State College, State College, Pa.....	July 18, 1906
PW WALKER, FRANCIS B. Chief Engr., Filtration Plant, Oshawa, Ont., Canada.....	Dec. 18, 1933
APW WALKER, ISAAC S. Cons. Engr., 629 Chestnut St., Philadelphia, Pa.....	Mar. 25, 1919
WALKER, LEWIS D. Water Works Engr., Canadian Fire Underwriters Association, Metropolitan Bldg., Toronto, Ont., Canada.....	Feb. 10, 1921
PW WALKER, W. H. Township Engr., Engineering Dept., Township of Etobicoke, Islington, Ont., Canada.....	Mar. 11, 1932
PW WALKER, WALTER E. Chief Engr., Water Works, North Road, Poughkeepsie, N. Y.....	Mar. 25, 1929
PW WALL, EDWARD E. Director of Public Utilities, City Hall, St. Louis, Mo.....	June 7, 1904
WALL, V. M. Pacific Coast Mgr., National Cast Iron Pipe Co., 625 S. Western Ave., Los Angeles, Calif.....	Oct. 31, 1929
AW WALLACE, DONALD S. District Engr., U. S. Geological Survey, Ocala, Fla.....	May 7, 1934
PW WALLACE, WILLIAM M. Filter Supt. & Chief Chemist, Filtration Plant, Water Works Park, Detroit, Mich.....	Apr. 5, 1922
PW WALLER, R. O. Jr. San. Engr., Div. of Water Purification, Bureau of Engineering, Navy Pier, Chicago, Ill.....	May 23, 1933
WALLIS, L. E. Supt., Water & Light Dept., Elberton, Ga.....	Feb. 20, 1933
APW WALTER, HENRY L. Western Chlorinator Co., Inc., Route 1, Twin Falls, Ida.....	Aug. 14, 1933
APW WALTERS, GROVER L. Supt. of Water Works, City Hall, 123 West Wilshire, Fullerton, Calif.....	Oct. 31, 1930
P WALTHALL, E. B. Vice Pres., California Water Service Co., 501 Federal Reserve Bank Bldg., San Francisco, Calif.....	Oct. 26, 1931
WARD, CLAYTON N. Hyd. Engr., Mead & Seastone, 2225 Rowley Ave., Madison, Wis.....	June 17, 1930
W WARD, JOE E., C.E. Montgomery & Ward, Cons. Civil Engrs., 545 Harvey-Snyder Bldg., Wichita Falls, Tex....	June 17, 1926
WARD, JOSEPH A. Pompton Plains, N. J.....	Apr. 30, 1930

	Joined
APW WARD, R. V. Engr., Cucamonga Basin Protective Association, R. R. 1, Box 27, Upland, Calif.	May 8, 1930
PW WARDE, JOHN S. Rensselaer Valve Co., 50 Church St., New York, N. Y.	May 8, 1930
WARDER, CHARLES. Supt. of Water Works, Niagara Falls, Ont., Canada.	Jan. 8, 1916
W WARING, F. HOLMAN. Chief Engr., State Dept. of Health, Columbus, O.	Feb. 23, 1915
PW WARNER, T. E. Mech. Supt., Corp. of Ottawa, 82 Chamberlain Ave., Ottawa, Ont., Canada.	Apr. 6, 1933
WARREN, J. B. Director of Biology, Brockway Testing Laboratories, Box 43, DuBois, Pa.	Apr. 17, 1930
PW WARRICK, LOUIS F. State San. Engr., State Board of Health, Madison, Wis.	Apr. 6, 1920
APW WATERMAN, EARLE L. Prof. of San. Engineering, University of Iowa, 104 Engineering Hall, Iowa City, Iowa.	Dec. 11, 1922
PW WATKINS, J. S. Cons. Engr., 714 Citizens Bank Bldg., Lexington, Ky.	Aug. 18, 1933
APW WATKINS, SAMUEL C. Supt., Water Dept., Aberdeen, Wash.	Apr. 30, 1929
WATKINS, WILLIAM W. Supt., Water Dept., 130 East St., Oneonta, N. Y.	June 5, 1922
P WEATHERFORD, L. L. Supt., Atchison Water Co., P. O. Box 374, Atchison, Kans.	May 20, 1930
W WEAVER, S. M. Supt. of Water Works, Monroe, Mich.	Jan. 19, 1925
WEBB, S. W. Dist. Mgr., Consumers Power Co., Cadillac, Mich.	Jan. 8, 1921
AP WEBSTER, A. D. Supt., Munic. Water, Light & Ice Plant, 135 E. Water St., Orrville, O.	July 29, 1929
APW WEBSTER, DAVID L. Chief Engr. & Mech. Supt., Pioneer Distillers, Ltd., Amherstburg, Ont., Canada.	June 13, 1934
AP WECKWERTH, H. F. Supt., Kaukauna Water Works, Kaukauna, Wis.	June 17, 1930
WEED, FREDERICK H. 135 Monte Vista Ave., Ridgewood, N. J.	Nov. 10, 1925
W WEIDLEIN, E. R., Sc.D. Mellon Institute of Industrial Research, Thackeray & O'Hara Sts., Pittsburgh, Pa.	June 26, 1924
WEIDNER, HAYES. Supt. of Water & Sewers, 516 N. Leroux St., Flagstaff, Ariz.	July 19, 1932
WEILER, LOUIS C. Supt., Dept. of Water Supply, Gas & Electricity, Bergen Bldg., Bronx, New York, N. Y.	May 26, 1930
W WEIR, PAUL. Hemphill Ave. Station, Atlanta Water Works, Atlanta, Ga.	Dec. 31, 1929
PW WEIR, W. H. State Board of Health, State Capitol Bldg., Atlanta, Ga.	Dec. 29, 1924
APW WEIR, W. VICTOR. Supt., St. Louis County Water Co., 6600 Delmar Blvd., University City, Mo.	July 14, 1924
AP WEISENBERGER, VICTOR. Supt., Water Dept., Tell City, Ind.	May 17, 1928
WENTWORTH, FRANKLIN H. Managing Director, National Fire Protection Association, 60 Batterymarch St., Boston, Mass.	May 28, 1924
WENTWORTH, JOHN P. Cons. Engr., Metcalf & Eddy, Cons. Engrs., 1300 Statler Bldg., Boston, Mass.	July 10, 1926
WENZEL, HERMAN C. Commissioner of Public Works, Court House, St. Paul, Minn.	Apr. 6, 1933
PW WERTZ, C. F. San. Engr., Fuller & McClintock, Cons. Engrs., 11 Park Place, New York, N. Y.	Mar. 25, 1924
APW WEST, CHAS. C. Gen. Mgr., Sayre Water Co., Sayre, Pa.	Dec. 21, 1922
WEST, GEO. F. Pres., Biddeford & Saco Water Co., Portland, Me.	July 24, 1911

Joined

	W WEST, VERNON F. Rensselaer Water Co., Box 868, Portland, Me.....	June 19, 1914
1930	W WESTON, ARTHUR D. Chief Engr., State Dept. of Public Health, 511a State House, Boston, Mass.....	July 3, 1931
1930	APW WETTER, CLARENCE H. Supt. of Water Works, Tiffin, O.....	July 15, 1915
1916	APW WHARTON, JOHN S. M. Pres., Consolidated Water Co. of Utica, 712 Washington St., Utica, N. Y.....	Jan. 18, 1934
1915	W WHEELER, ROBERT C. Barker & Wheeler, 36 State St., Albany, N. Y.....	Oct. 23, 1914
1933	W WHELCHER, H. E. Supt., Water Works, College Park, Ga.....	Nov. 24, 1930
1930	W WHIPPLE, MELVILLE C. Asst. Prof. of San. Chemistry, Harvard University, 112 Pierce Hall, Cambridge, Mass.....	May 13, 1922
1920	P WHITAKER, OTTO C. Pneumatic Machinery Co., 2305 E. 8th St., Los Angeles, Calif.....	Oct. 31, 1929
1922	PW WHITE, CHAS. F. Engr., 195 Wellesley St., Toronto, Ont., Canada.....	Apr. 6, 1933
1933	W WHITE, GUY H. Supt. of Water Plant, 2217 Gadsden St., Columbia, S. C.....	Nov. 24, 1925
1929	WHITE, HENRY M. Supt. of Water Works, Oneida, N. Y.....	May 24, 1922
1922	WHITE, HERBERT L. San. Engr., University of Illinois, 256 Administration Bldg., W., Urbana, Ill.....	Jan. 1, 1932
1930	WHITE, JOHN C. State Power Plant Engr., 624 E. Main St., Madison, Wis.....	May 8, 1930
1925	APW WHITE, STEWART H. Supt. of Utilities, 138 W. Front St., Port Angeles, Wash.....	May 14, 1934
1921	PW WHITELEY, DONALD. Asst. Engr., Bradford Waterworks Dept., Town Hall, Bradford, Yorkshire, England.....	Feb. 10, 1931
1929	W WHITENER, J. SUMMIE. Assoc. Prof. of San. Engineering, North Carolina State College, 1202 Cowper Drive, Raleigh, N. C.....	Dec. 13, 1924
1934	W WHITMAN, EZRA B. Whitman, Requardt & Smith, Engrs., West Biddle & Charles Sts., Baltimore, Md.....	Apr. 19, 1910
1930	APW WHITMAN, JOSEPH A. Supt. of Utilities, Box 194, Raleigh, N. C.....	Jan. 1, 1934
1925	P WHITMAN, N. D. Chief Engr., American Concrete & Steel Pipe Co., P. O. Box 1428, Arcade Station, Los Angeles, Calif.....	Sept. 30, 1929
1932	PW WHITTAKER, H. A. Director, Div. of Sanitation, State Board of Health, Minneapolis, Minn.....	June 24, 1913
1930	WHITTEN, BREWER. Filter Plant Operator, Fieldale, Va.....	June 26, 1934
1929	PW WHITTIER, W. E. Distribution Engr., Metropolitan Water District, 306 W. 3rd St., Los Angeles, Calif.....	Oct. 17, 1931
1924	W WHYSALL, GEORGE. Vice-Pres. & Mgr., Marion Water Co., Marion, O.....	Oct. 13, 1928
1924	PW WIEDEMAN, H. F. Wiedeman & Singleton, Inc., P. O. Box 1878, Atlanta, Ga.....	Mar. 27, 1925
1928	APW WIEGHARDT, GEORGE F. Hyd. Engr., 1337 Dickerson Road, West Englewood, N. J.....	Mar. 25, 1924
1924	APW WIEL, KURT. City Engr., Miles City, Mont.....	Feb. 19, 1934
1924	PW WIESNER, HENRY, JR. San. Engr., 427 S. Broadway, Wheeling, W. Va.....	July 17, 1934
1924	W WIETERS, A. H. Chief Engr., Div. of San. Engineering & Housing, State Dept. of Health, Des Moines, Iowa.....	Nov. 14, 1921
1924	WIGGIN, THOMAS H. Cons. Engr., 40 Exchange Place, New York, N. Y.....	May 24, 1922
1924	PW WIGHTMAN, C. R. Director of Public Works, City Hall, Benton Harbor, Mich.....	Apr. 30, 1934
1924	WIGLEY, CHESTER G., C.E. Guarantee Trust Bldg., Atlantic City, N. J.....	Apr. 27, 1910

	Joined
W WILBUR, C. C. Senior Engr., Water Dept., 204 W. Franklin Ave., Minneapolis, Minn.....	Feb. 20, 1924
PW WILCOX, WILLIAM F., M.E. Box 698, Atlanta, Ga.....	Sept. 5, 1893
W WILDER, GEO. W. Chemist, City Water Dept., City Hall, Tampa, Fla.....	Nov. 15, 1929
W WILEY, RALPH B. Prof. of San. Engineering, Purdue University, 777 Russell St., West Lafayette, Ind.....	Apr. 23, 1934
APW WILLARD, ERNEST C. Cons. Engr., 720 Corbett Bldg., Portland, Ore.....	Oct. 10, 1914
PW WILLCOMB, GEORGE E. San. Engr., 12 S. Lyons Ave., Albany, N. Y.....	Apr. 7, 1922
WILLETT, W. M. Gen. Mgr., Western United Gas & Electric Co., 70 Fox St., Aurora, Ill.....	Sept. 21, 1918
WILLIAMS, ARTHUR M. Supt. of Filtration, Wisconsin Hydro-Electric Co., Hurley, Wis.....	Oct. 1, 1934
WILLIAMS, CHAS. H. City Engr. & Water Supt., 826 Percival St., Olympia, Wash.....	July 1, 1934
P WILLIAMS, CHARLES P. Cons. Engr., 4259 Witherby St., San Diego, Calif.....	Nov. 21, 1932
WILLIAMS, HOWARD L. Supt., Water Works, Ludington, Mich.....	Aug. 24, 1894
APW WILLIAMS, LEON G. Civil Engr., Greeley & Hansen, Cons. Engrs., 6 N. Michigan Ave., Chicago, Ill.....	July 23, 1928
WILLIAMSON, JAMES E. Cons. Engr., 39 Cortlandt St., New York, N. Y.....	Jan. 20, 1921
WILLIAMSON, R. Chairman, Public Utilities Commission, Watford, Ont., Canada.....	Apr. 25, 1934
WILLIAMSON, RICHARD C. Chem. Engr., Paterson Engineering Co. of Canada, Ltd., 32 Keewatin Ave., Toronto, Ont., Canada.....	Apr. 25, 1934
PW WILLIS, FRANK T. C. C. M. O. Co., Water Plant, Box B, Reward, Calif.....	Sept. 30, 1929
W WILLS, W. COMPTON. Chief Engr., Water Dept., 16th & French Sts., Wilmington, Del.....	July 10, 1926
WILLSON, WILLIAM J. Supt. of Water Works, Greenwich, Conn.....	June 7, 1916
W WILSON, CARL. 405 S. Hill St., Los Angeles, Calif.....	June 30, 1928
P WILSON, EDGAR K. Chief Engr., The Pitometer Co., 54 Carolin Road, Upper Montclair, N. J.....	Mar. 6, 1926
P WILSON, GUY L. Local Supt., Washington Water Power Co., Lewiston, Ida.....	July 6, 1934
W WILSON, I. E. Water Commissioner, City Hall, Faribault, Minn.....	Sept. 21, 1922
WILSON, JAMES C. Night Supt., Water Works Dept., Ottawa, Ont., Canada.....	Feb. 20, 1933
W WILSON, JOHN J. Dist. Engr., National Tube Co., 415 Continental Oil Bldg., Denver, Colo.....	Mar. 10, 1926
APW WILSON, PERCY S. 325 Washington St., Glen Ridge, N. J.....	July 16, 1926
WINKLE, CHARLES W. Supt., Maintenance & Transportation, Indianapolis Water Co., 620 W. Market St., Indianapolis, Ind.....	Dec. 29, 1924
W WINSLOW, C. F. A. Yale Medical School, New Haven, Conn...	Jan. 30, 1915
WINSLOW, EDWARD L., JR. 201 E. Taylor St., Zanesville, O...	Apr. 9, 1930
W WINSOR, FRANK E. Chief Engr., Metropolitan District Water Supply Commission, 20 Somerset St., Boston, Mass.....	Jan. 26, 1924
P WITT, CHARLES V. Steel Watermains Association, Inc., Huff Bldg., Greensburg, Pa.....	Oct. 16, 1933
AP WOLBERT, H. E. Supt., Board of Water Supply, Mount Vernon, N. Y.....	May 26, 1916
PW WOLFE, EDWARD E. Chemist, Water Dept., Hannibal, Mo....	Apr. 24, 1922

Joined

APW WOLFE, THOMAS F.	Research Engr., Cast Iron Pipe Research Association, 309 Peoples Gas Bldg., Chicago, Ill.	Mar. 16, 1922
WOLFF, WILLIAM R.	Asst. Engr., Public Service Commission, 80 Centre St., New York, N. Y.	Mar. 4, 1930
APW WOLMAN, ABEL	Chief Engr., State Dept. of Health, 2411 N. Charles St., Baltimore, Md.	Mar. 11, 1918
W WOLTMAN, J. J., C.E.	225 Unity Bldg., Bloomington, Ill.	May 20, 1923
PW WOOD, C. LELAND	Supt. of Municipal Commission, Herkimer, N. Y.	July 19, 1927
APW WOOD, GEORGE P.	Supt., Board of Water Commissioners, Municipal Bldg., Peekskill, N. Y.	Jan. 30, 1931
D WOOD, LEONARD P.	Asst. Engr., Board of Water Supply, 346 Broadway, New York, N. Y.	Mar. 5, 1924
P WOOD, THEODORE V.	R. D. Wood Co., 400 Chestnut St., Philadelphia, Pa.	Apr. 9, 1930
P WOODHOUSE, GLENN A.	Engr., American Water Works & Electric Co., 50 Broad St., New York, N. Y.	Apr. 25, 1932
AP WORDEN, E. P.	Cons. Engr., 1 Hamilton Road, Glen Ridge, N. J.	Sept. 30, 1929
PW WORMSER, FELIX E.	Sect., Lead Industries Association, 420 Lexington Ave., New York, N. Y.	Feb. 16, 1932
WORTH, A. M.	Durham, N. C.	Apr. 23, 1924
WRIGHT, C. W.	Pres., Badger Meter Mfg. Co., 2357-71 N. 30th St., Milwaukee, Wis.	Mar. 19, 1927
WRIGHT, JAS.	Supt., Water Works, Dundas, Ont., Canada	Apr. 29, 1924
P WRIGHT, JOHN A.	Draughtsman & Inspector, New Rochelle Water Co., New Rochelle, N. Y.	June 10, 1930
W WRIGHT, LE ROY H.	Supt. of Water Works, City Hall, Newark, N. Y.	Apr. 12, 1927
WUESTE, R. C.	Supervisor, San Diego Water Impounding System, 4288 Arguello St., San Diego, Calif.	May 12, 1925
WYANT, CARL	Resident Engr., Montecito County Water District, 141 San Ysidro Rd., Santa Barbara, Calif.	Mar. 5, 1924
APW WYATT, RALPH C.	Supt., City Water Works, Box 346, Danville, Ky.	Dec. 27, 1932
WYCKOFF, CHARLES R.	1239 New York Post Road, Scarsdale, N. Y.	Apr. 2, 1918
W WYCKOFF, NORMAN R.	906 Detroit Savings Bank Bldg., Detroit, Mich.	Sept. 11, 1923
APW WYNNE-ROBERTS, R. O.	Wynne-Roberts, Son & McLean, Metropolitan Bldg., 44 Victoria St., Toronto, 2, Ont., Canada	June 24, 1903
PW YAXLEY, R. GORDON	Supt. to Water Commissioners, Waterford, N. Y.	Oct. 13, 1925
W YEGEN, WILLIAM	Supt. of Filtration Plant, 422-9th St., Bismarck, N. D.	June 6, 1927
PW YOBST, CHARLES B.	Supt., Water Works, City Hall, Fort Wayne, Ind.	Feb. 28, 1930
YOUNCE, W. L.	Asst. Supt., Public Service Co. of Indiana, New Albany, Ind.	July 1, 1924
W YOUNG, C. H.	Dist. Engr., State Dept. of Health, Trust Bldg., Meadville, Pa.	June 25, 1929
P YOUNG, GEORGE R.	Village Mgr., Village Hall, Glencoe, Ill.	July 9, 1928
YOUNG, SAMUEL R.	Supt. of Water & Sewers, P. O. Box 385, Hardin, Mont.	May 31, 1934
YOUNG, T. L.	Mgr., South Side Water Works Co., Chester, W. Va.	June 13, 1921
APW Yow, W. E.	Supt., Water Dept., Asheboro, N. C.	Dec. 21, 1933

	Joined
W ZANETTI, FRANCISCO E. Chemist & Bacteriologist, Water Works, P. O. Box 1742, Havana, Cuba.....	Feb. 28, 1930
PW ZUFELT, JEROME C. Filtration Plant Supt., 418 St. Clair Ave., Sheboygan, Wis.....	Oct. 27, 1931

CORPORATE MEMBERS

ADIRONDACK WATER WORKS. H. N. Haberer, Lowville, N. Y..	Jan. 12, 1923
W AGUA PURA CO. 701 Douglas Ave., East Las Vegas, N. M.....	May 24, 1909
ALLENTOWN WATER DEPT. City Hall, Allentown, Pa.....	May 31, 1922
APW AMERICAN STATES PUBLIC SERVICE CO. 950 Bendix Bldg., 1206 S. Maple Ave., Los Angeles, Calif.....	June 30, 1929
AMERICAN WATER WORKS & ELECTRIC CO., INC. H. Hobart Porter, Pres., 50 Broad St., New York, N. Y.....	June 24, 1915
ANACONDA COPPER MINING CO. Water Works Dept., Anaconda, Mont.....	June 4, 1910
ANN ARBOR WATER WORKS COMMISSION. City Hall, Ann Arbor, Mich.....	Apr. 14, 1919
ARKANSAS POWER & LIGHT CO. R. J. Rhinehart, Distribution Supt., Pine Bluff, Ark.....	May 18, 1909
APW AUBURN WATER DEPT. Auburn, N. Y.....	Mar. 8, 1911
BATON ROUGE WATER WORKS CO. Baton Rouge, La.....	Apr. 13, 1914
APW BEAR GULCH WATER CO. A. F. Poulter, Supt., Box 246, Menlo Park, Calif.....	May 26, 1932
BELLEVILLE, CORPORATION CITY OF. Belleville, Ont., Canada.	Apr. 25, 1934
PW BETHLEHEM, CITY OF. 37 E. Broad St., Bethlehem, Pa.....	Apr. 27, 1925
BEVERLY HILLS WATER DEPT. John L. Perhab, Plant Supt., City Hall, Beverly Hills, Calif.....	Sept. 21, 1926
BIRMINGHAM WATER CO. 33 Elizabeth St., Derby, Conn.....	May 26, 1909
BOULDER WATER DEPT. H. C. McClintock, Director of Public Service, Boulder, Colo.....	Jan. 27, 1927
BOZEMAN WATER DEPT. Bozeman, Mont.....	Jan. 1, 1933
W BRAMPTON WATER COMMISSION. Brampton, Ont., Canada...	Feb. 28, 1923
BRANTFORD WATER COMMISSIONERS. Brantford, Ont., Canada.....	May 15, 1914
BUFFALO DIVISION OF WATER. 107 City Hall, 65 Niagara Square, Buffalo, N. Y.....	June 9, 1921
AP BURBANK PUBLIC SERVICE DEPT. J. H. McCambridge, Gen. Supt., 124 N. Olive St., Burbank, Calif.....	June 6, 1927
CANON CITY. Fred Brockney, Asst. Water Supt., Box 407, Canon City, Colo.....	Apr. 13, 1926
CHARLESTON COMMISSIONERS OF PUBLIC WORKS. 14 George St., Charleston, S. C.....	May 23, 1912
CHATHAM BOARD OF WATER COMMISSIONERS. Chatham, Ont., Canada.....	Feb. 16, 1924
CHILLICOTHE WATER CO. John A. Poland, Pres., Chillicothe, O.....	Oct. 31, 1930
CITIZENS WATER CO. 62 E. Wheeling St., Washington, Pa....	Jan. 6, 1927
AW CITIZENS WATER SUPPLY CO. Elmhurst, L. I., N. Y.....	Jan. 30, 1911
COMMUNITY WATER SERVICE CO. Reeves J. Newsom, Pres., 100 William St., New York, N. Y.....	Jan. 6, 1927
APW CONNECTICUT PUBLIC UTILITIES COMMISSION. E. Irvine Rudd, Chief Engr., State Office Bldg., Hartford, Conn...	Mar. 14, 1932
CORNING WATER WORKS. Corning, N. Y.....	Apr. 9, 1913
A CORONADO WATER CO. P. O. Box 1, National City, Calif.....	Jan. 1, 1932
PW COVINGTON. J. T. Kingsley, Director of Public Property, Room 8, City Bldg., Covington, Ky.....	May 10, 1932
DALLAS CITY WATER WORKS. Dallas, Tex.....	June 6, 1927
W DELAVAN WATER COMMISSION. Chas. S. Moses, Supt., Delavan, Wis.....	June 10, 1923
DEMING WATER DEPT. Municipal Plant, Deming, N. M.....	May 21, 1919

Joined

APW DENVER, CITY & COUNTY OF.	Board of Water Commissioners, E. G. Plowman, Exec. Asst. to Board, P. O. Box 629, Denver, Colo.	Apr. 6, 1934
AP DISTRICT OF COLUMBIA WATER DEPT.	J. B. Gordon, Director of San. Engineering, Municipal Bldg., Washington, D. C.	Apr. 14, 1931
A DOVER WATER COMMISSIONERS.	Jos. V. Baker, Clerk, Dover, N. J.	May 22, 1918
DURHAM WATER DEPT.	City Hall, Durham, N. C.	July 1, 1934
EAST BAY MUNICIPAL UTILITY DISTRICT.	F. W. Hanna, Chief Engr. & Gen. Mgr., 512 Sixteenth St., Oakland, Calif.	Sept. 30, 1929
AP ELECTRIC BOND & SHARE CO.	Norman Read, 2 Rector St., New York, N. Y.	Mar. 16, 1929
AP ELMIRA WATER BOARD.	Elmira, N. Y.	Mar. 11, 1915
APW EMPORIUM WATER CO.	Emporium, Pa.	Mar. 6, 1926
ENDICOTT WATER WORKS CO.	Earle J. Grippen, Supt., Endi- cott, N. Y.	Feb. 28, 1928
PW ERIE COMMISSIONERS OF WATER WORKS.	P. O. Box 1217, Erie, Pa.	May 31, 1911
EVANSVILLE WATER WORKS.	P. O. Box 236, Evansville, Ind.	May 7, 1906
FEDERAL LIGHT & TRACTION CO.	70 Pine St., New York, N. Y.	Mar. 8, 1920
FIRE UNDERWRITERS INSPECTION BUREAU.	Lock Drawer 1746, Minneapolis, Minn.	Feb. 9, 1924
FISHERS ISLAND FARMS, INC.	Harold J. Baker, Fishers Island, N. Y.	May 31, 1930
FLINT BOARD OF WATER COMMISSIONERS.	City Hall, Flint, Mich.	Nov. 18, 1925
FOND DU LAC CITY WATER DEPT.	E. J. Braun, Supt., Fond du Lac, Wis.	May 22, 1919
FORT COLLINS, CITY OF.	Colo.	Mar. 16, 1926
P FRESNO CITY WATER DEPT.	Claude H. Weekes, Supt., 1926 Tuolumne St., Box 1274, Fresno, Calif.	Jan. 1, 1932
GAINESVILLE, CITY OF.	W. A. Ford, City Mgr., Gainesville, Fla.	June 21, 1929
GANANOQUE WATER WORKS COMMISSION.	H. D. Rogers, Supt., Gananoque, Ont., Canada.	Mar. 16, 1927
APW GENERAL MANAGEMENT CORP.	C. A. Davis, 1500 Walnut St., Philadelphia, Pa.	May 26, 1930
W GLENDALE PUBLIC SERVICE DEPT.	Peter Diederich, Supt., 120 N. Howard St., Glendale, Calif.	Dec. 24, 1914
GLEN RIDGE WATER DEPT.	A. F. Eschenfelder, Glen Ridge, N. J.	Oct. 27, 1922
W GLENS FALLS BOARD OF WATER COMMISSIONERS.	Glen Falls, N. Y.	Oct. 24, 1918
AP GRAND RAPIDS DEPT. OF PUBLIC SERVICE.	Grand Rapids, Mich.	Feb. 14, 1913
GREAT FALLS WATER DEPT.	Great Falls, Mont.	Jan. 31, 1925
GREELEY, CITY OF.	M. Seaman, Water Supt., Greeley, Colo.	Apr. 30, 1926
GREEN BAY WATER DEPT.	James Church, Supt., Green Bay, Wis.	Nov. 3, 1914
PW GRIFFIN LIGHT, WATER & SEWERAGE DEPT.	Griffin, Ga.	Feb. 16, 1924
GRIMSBY WATER COMMISSION.	W. B. Smith, Chief Engr. & Supt., Grimsby, Ont., Canada.	Feb. 23, 1927
W GUELPH.	H. S. Nicklin, City Engineer, City Hall, Guelph, Ont., Canada.	Mar. 25, 1924
W GUNTERSVILLE WATER WORKS.	J. L. McIntyre, Supt., Gun- tersville, Ala.	Feb. 25, 1927
APW HICKORY, CITY OF.	H. K. Setzer, Supt. of Public Works, Hickory, N. C.	Nov. 8, 1933

	Joined
HILLSIDE DISTRIBUTION CO. C. H. Richards, R. F. D. 1, Box 73-A, Whittier, Calif.....	Oct. 31, 1930
P HOLLISTER WATER CO. Hollister, Calif.....	Nov. 13, 1933
APW HONOLULU, BOARD OF WATER SUPPLY. Frederick Ohrt, Mgr., City & County of Honolulu, P. O. Box 3347, Honolulu, T. H.....	Nov. 14, 1930
HOT SPRINGS WATER CO. Hot Springs, Ark.....	Mar. 23, 1920
AP HOUSTON DEPT. OF PUBLIC WORKS, WATER DIVISION. J. B. Dannenbaum, Engr., 227 City Hall, Houston, Tex.....	Sept. 1, 1934
IDAHO SURVEYING & RATING BUREAU. P. O. Box 1069, Boise, Ida.....	Feb. 9, 1924
ILION BOARD OF WATER COMMISSIONERS. Ilion, N. Y.....	Mar. 31, 1924
ILLINOIS INSPECTION BUREAU. 108 E. Ohio St., Chicago, Ill...	Jan. 30, 1924
PW INDIANA BUREAU OF SAN. ENGINEERING. State Division of Public Health, L. A. Geupel, Chief Engr., Indianapolis, Ind.....	June 15, 1926
JOHNSON CITY WATER DEPT. Arthur J. Merrill, Supt., John- son City, N. Y.....	Sept. 30, 1925
KANSAS CITY, DIRECTOR OF THE WATER DEPT. City Hall, Kansas City, Mo.....	Feb. 8, 1915
KENNEBEC WATER DISTRICT, TRUSTEES. A. B. Thompson, Waterville, Me.....	May 12, 1912
W KENTUCKY STATE BOARD OF HEALTH. F. C. Dugan, Director, Bureau of San. Engineering, 532 W. Main St., Louis- ville, Ky.....	Feb. 5, 1915
KENTUCKY-TENNESSEE LIGHT & POWER CO. Bowling Green, Ky.....	Apr. 23, 1915
KENTUCKY UTILITIES CO. Fayette Bank Bldg., Lexington, Ky.....	Feb. 13, 1905
AP KITCHENER WATER COMMISSION. Kitchener, Ont., Canada...	Feb. 17, 1920
W KNOXVILLE WATER DEPT. City Hall Park Bldg., Knoxville, Tenn.....	May 23, 1923
LAGUNA BEACH COUNTY WATER DISTRICT WATER WORKS, Laguna Beach, Calif.....	Oct. 31, 1929
LAJUNTA, CITY OF. Colo.....	Sept. 18, 1926
AW LAKE FOREST WATER DEPT. J. C. McNicol, Mgr., City Hall, Lake Forest, Ill.....	May 24, 1927
LANSING BOARD OF WATER & ELECTRIC LIGHT COMMISSIONERS. Otto E. Eckert, Gen. Mgr., Lansing, Mich.....	June 24, 1929
APW LAWRENCE CITY WATER DEPT. C. T. Hough, Water Supt., City Hall, Lawrence, Kans.....	Feb. 17, 1927
LEWISTOWN-REEDSVILLE WATER CO. Lewistown, Pa.....	May 14, 1922
LINCOLN CITY WATER & LIGHTING DEPT. City Hall, Lincoln, Neb.....	Mar. 6, 1919
AP LOMPOC LIGHT & WATER DEPT. 124½ South H St., Lompoc, Calif.....	Apr. 9, 1930
LONDON PUBLIC UTILITIES COMMISSION. London, Ont., Canada.....	Apr. 9, 1909
APW LONG BEACH WATER DEPT. Long Beach, Calif.....	Oct. 31, 1931
LOS ANGELES DEPT. OF WATER & POWER. H. A. Van Norman, Gen. Mgr. & Chief Engr., Los Angeles, Calif.....	Apr. 18, 1910
APW LOUISVILLE WATER CO. 435 S. Third St., Louisville, Ky.....	Apr. 9, 1909
PW LOVELAND, CITY OF. Colo.....	Apr. 13, 1926
MACON BOARD OF WATER COMMISSIONERS. City Hall, Macon, Ga.....	Apr. 22, 1929
W MALMO BYGGNADSKONTOR. Alfred Jerden, Chief Engr., Malmo, Sweden.....	July 23, 1921
APW McMINNVILLE WATER & LIGHT DEPT. M. H. McGuire, Mgr., McMinnville, Ore.....	July 1, 1934

Joined

	AP MEDFORD WATER COMMISSION. Robert A. Duff, Supt., 9 W. Jackson St., Medford, Ore.....	Mar. 11, 1930
	APW MEMPHIS BOARD OF WATER COMMISSIONERS. Memphis, Tenn.	Apr. 2, 1909
	PW MERRITTON WATER WORKS DEPT. Public Utilities Commission, Merritton, Ont., Canada.....	June 17, 1926
	MIDDLETOWN WATER WORKS. G. Allen Schaefer, Middletown, Conn.....	June 8, 1921
	APW MIDLAND PUBLIC UTILITIES COMMISSION. P. O. Box 548, Midland, Ont., Canada.....	Mar. 16, 1927
	MILLVILLE WATER CO. Millville, N. J.....	Jan. 11, 1916
	MINNEAPOLIS COMMITTEE ON WATER WORKS. Minneapolis, Minn.....	June 17, 1920
	MOLINE WATER DEPT. City Hall, Moline, Ill.....	Jan. 29, 1916
	P MOUNT HOLLY WATER CO. Mount Holly, N. J.....	Apr. 30, 1924
	MUSCATINE WATER TRUSTEES. Muscatine, Iowa.....	May 9, 1921
	NEW JERSEY WATER CO. 610 Station Ave., Haddon Heights, N. J.....	Jan. 6, 1927
	APW NEW MEXICO POWER CO. Santa Fe, N. M.....	Mar. 12, 1924
	APW NEW ROCHELLE WATER CO. 514 Main St., New Rochelle, N. Y.	Jan. 6, 1927
	NEW TORONTO PUBLIC UTILITIES COMMISSION. A. H. R. Thomas, Supt. of Water Works, New Toronto, Ont., Canada.....	Jan. 23, 1933
	PW NIAGARA FALLS, CITY OF. City Hall, Niagara Falls, Ont., Canada.....	Feb. 25, 1932
	P NORTH YORK, CORP. OF TOWNSHIP OF. Willowdale, Ont., Canada.....	Feb. 29, 1932
	NORTHEASTERN WATER & ELECTRIC SERVICE CORP. John Latta, 57 William St., New York, N. Y.....	Jan. 1, 1933
	NORTH DAKOTA REGULATORY DEPT. C. S. Ladd, Food Commissioner & Chemist, Bismarck, N. D.....	Jan. 19, 1926
	OAKVILLE WATER & LIGHT COMMISSION. Oakville, Ont., Canada.....	Apr. 23, 1934
	OBRAS SANITARIAS DE LA NACION. Biblioteca, Charcas 1840, Buenos Aires, Argentina.....	Jan. 1, 1926
	APW OBRAS SANITARIAS OF ENTRE RIOS. Alberto F. Laurencena, Pres. of Directory, Parana, Argentina.....	Apr. 21, 1928
	OCONOMOWOC WATER DEPT. F. R. Hubbard, Supt., Oconomowoc, Wis.....	June 30, 1929
	OIL CITY BUREAU OF WATER, MUNICIPAL CORPORATION. 248 Seneca St., Oil City, Pa.....	July 1, 1934
	OLEAN BOARD OF WATER COMMISSIONERS. City Hall, Olean, N. Y.....	Apr. 19, 1929
	OMAHA METROPOLITAN UTILITIES DISTRICT. Utilities Bldg., Harney & Eighteenth Sts., Omaha, Neb.....	Apr. 28, 1912
	ONTARIO DEPT. OF HEALTH. Experimental Station, 807 Richmond St., W., Toronto, Ont., Canada.....	Apr. 16, 1934
	PW ORILLIA WATER, LIGHT & POWER COMMISSION. L. G. McNeice, Water Works Engr., Orillia, Ont., Canada.....	Apr. 16, 1934
	W ORLANDO UTILITIES COMMISSION. Orlando, Fla.....	Aug. 18, 1933
	OSHAWA PUBLIC UTILITIES COMMISSION. G. F. Shreve, Gen. Mgr. & Sect., 100 Simcoe St., S., Oshawa, Ont., Canada..	Jan. 19, 1933
	OSWEGO DEPT. OF WATER. Oswego, N. Y.....	June 1, 1921
	OTTAWA, CORPORATION OF. Water Works Dept., Transportation Bldg., Ottawa, Ont., Canada.....	Mar. 14, 1933
	APW OWEGO WATER WORKS. Owego, N. Y.....	Apr. 16, 1914
	AP PADUCAH WATER WORKS. Lois Sutherland, Treas., Paducah, Ky.....	Jan. 29, 1934
	PASADENA WATER DEPT. Samuel B. Morris, Chief Engr., City Hall, Civic Center, Pasadena, Calif.....	Oct. 14, 1924

	Joined
A PENNICHUCK WATER WORKS. 11 High St., Nashua, N. H.....	Oct. 30, 1914
PEORIA WATER WORKS CO. Peoria, Ill.....	Jan. 6, 1927
PETERBOROUGH UTILITIES COMMISSION. R. L. Dobbin, Gen. Mgr., 223 Aylmer St., Peterborough, Ont., Canada.....	May 2, 1911
PHILADELPHIA SUBURBAN WATER CO. 762 Lancaster Ave., Bryn Mawr, Pa.....	May 1, 1909
P PITTSBURG CITY WATER DEPT. Pittsburg, Calif.....	Feb. 15, 1930
PORT HOPE WATER WORKS COMMISSION. Box 100, Port Hope, Ont., Canada.....	Mar. 17, 1929
POUGHKEEPSIE BOARD OF PUBLIC WORKS. Water Dept., Poughkeepsie, N. Y.....	Dec. 11, 1912
PROVIDENCE WATER MAINTENANCE DEPT. City Hall, Providence, R. I.....	Oct. 9, 1924
PUBLIC SERVICE CO. OF INDIANA. 800 Traction Terminal Bldg., Indianapolis, Ind.....	Feb. 10, 1910
A QUINCY WATER WORKS COMMISSION. 314 Maine St., Quincy, Ill.....	Apr. 4, 1927
READING BUREAU OF WATER. Room 209, City Hall, Reading, Pa.....	Mar. 20, 1916
AP REGINA WATERWORKS DEPT. City Hall, Regina, Sask., Canada.....	Apr. 4, 1924
W RIVERSIDE WATER DEPT. R. L. Boulden, Riverside, Calif.....	July 22, 1926
A ROME, CITY OF. Dept. of Public Works, Bureau of Water, Rome, N. Y.....	Apr. 25, 1922
RUBIO CANON LAND & WATER ASSOCIATION. J. H. Parsons, Engr., 575 Sacramento St., Altadena, Calif.....	Oct. 31, 1930
SACRAMENTO DIVISION OF WATER. R. E. Mittelstaedt, Supt., Sacramento, Calif.....	Apr. 14, 1932
W ST. MARY'S PUBLIC UTILITIES COMMISSION. Box 1019, St. Marys, Ont., Canada.....	Nov. 3, 1919
ST. PAUL BOARD OF WATER COMMISSIONERS. Clyde R. May, Commissioner of Public Utilities, St. Paul, Minn.....	Apr. 29, 1929
W ST. THOMAS. Col. A. F. McLachlin, F.C.I.C., Ross St., St. Thomas, Ont., Canada.....	Apr. 11, 1909
A SALINA WATER DEPT. H. L. Brown, Supt., Salina, Kans.....	Feb. 17, 1927
W SALT LAKE CITY WATER DEPT. H. K. Burton, Supt., Salt Lake City, Utah.....	Feb. 17, 1920
APW SAN BERNARDINO BOARD OF WATER COMMISSIONERS. City Hall, San Bernardino, Calif.....	Nov. 21, 1933
AP SAN FRANCISCO WATER DEPT. N. A. Eckart, Gen. Mgr. & Chief Engr., 425 Mason St., San Francisco, Calif.....	Nov. 28, 1933
SAN JOSE WATER WORKS. H. S. Kittredge, Pres., 374 W. Santa Clara St., San Jose, Calif.....	Apr. 21, 1913
APW SANTA MONICA WATER DEPT. City Hall, Santa Monica, Calif.....	June 5, 1926
SCRANTON-SPRING BROOK WATER SERVICE CO. 135 Jefferson Ave., Scranton, Pa.....	June 3, 1912
SEATTLE WATER DEPT. H. D. Fowler, Supt., County City Bldg., Seattle, Wash.....	July 23, 1928
SHEBOYGAN BOARD OF WATER COMMISSIONERS. Arthur H. Miller, Supt., Sheboygan, Wis.....	June 21, 1920
SHENANGO VALLEY WATER CO. Shenango & Silver Sts., Sharon, Pa.....	Apr. 10, 1922
APW SHERRILL-KENWOOD WATER COMMISSION. Stephen R. Leonard, Chairman, Kenwood, Oneida, N. Y.....	Apr. 24, 1921
SHICKSHINNY WATER CO. W. B. Good, Sect., Shickshinny, Pa.....	July 13, 1933
SIERRA PACIFIC POWER CO. Reno, Nev.....	Feb. 4, 1913
P SIMCOE PUBLIC UTILITIES COMMISSION. W. D. Stalker, Sect.-Treas., Water Works Dept., Simcoe, Ont., Canada.....	Apr. 29, 1929

Joined		Joined
30, 1914 6, 1927	W SIOUX FALLS WATER WORKS. Jos. S. Nelson, Commissioner, Sioux Falls, S. D.....	May 24, 1927
2, 1911	SOUTH JERSEY ASSOCIATION OF WATER SUPERINTENDENTS. Walter Spencer, Sect., 7220 Walnut Ave., Merchantville, N. J.....	Apr. 30, 1931
1, 1909 15, 1930	APW SPOKANE. Alex Lindsay, Supt., Water Division, Room 302, City Hall, Spokane, Wash.....	Apr. 5, 1912
17, 1929	P SPRINGFIELD. Willis J. Spaulding, Commissioner of Public Property, Springfield, Ill.....	May 26, 1930
11, 1912	APW STRATHROY PUBLIC UTILITIES COMMISSION. A. E. Ditch- burn, Mgr., Strathroy, Ont., Canada.....	Feb. 16, 1932
9, 1924	SUBURBAN WATER CO. OF ALLEGHENY COUNTY, Verona, Pa....	Apr. 10, 1909
10, 1910	SWEETWATER WATER CORP. P. O. Box 1, National City, Calif.....	June 15, 1926
4, 1927	SYRACUSE BUREAU OF WATER. Syracuse, N. Y.....	Jan. 16, 1923
20, 1916	TECK, TOWNSHIP OF. F. G. Browne, Supt. of Water Works, Kirkland Lake, Ont., Canada.....	Feb. 25, 1932
4, 1924 22, 1926	TILBURY PUBLIC UTILITIES COMMISSION. P. J. Daigneau, Commissioner, Tilbury, Ont., Canada.....	Apr. 25, 1934
25, 1922	TILLSONBURG PUBLIC UTILITIES COMMISSION. S. Buckrell, Supt., Tillsonburg, Ont., Canada.....	Feb. 27, 1929
1, 1930	AP TIMMINS, CORPORATION TOWN OF. J. D. McLean, Town Engr., Box 433, Timmins, Ont., Canada.....	Feb. 20, 1933
4, 1932	TRENTON WATER WORKS. Trenton, N. J.....	May 8, 1909
3, 1919	TROY BUREAU OF WATER. William Luby, Troy, N. Y.....	May 28, 1924
9, 1929	URBAN WATER SUPPLY CO. Maurice & Borden Aves., Mas- peth, L. I., N. Y.....	Oct. 20, 1912
1, 1909 7, 1927	UTRECHTSCHIE WATERLEIDING-MAATSCHAPPIJ, 15 Predikheer- enkerkhof, Utrecht, Holland.....	Nov. 9, 1922
7, 1920	WACO WATER WORKS. 617 Washington Ave., Waco, Tex.....	Apr. 16, 1910
1, 1933	WAHIWA WATER CO., LTD. Wahiawa, Oahu, T. H.....	Apr. 20, 1923
1, 1933	WALKERVILLE-EAST WINDSOR WATER COMMISSION. Walker- ville, Ont., Canada.....	Apr. 30, 1931
1, 1913	APW WALLACEBURG, TOWN OF. Ont., Canada.....	Apr. 16, 1934
1, 1926	AW WARRENTON WATER CO. Warrenton, N. C.....	Nov. 27, 1928
1, 1912	WASHINGTON SUBURBAN SANITARY COMMISSION. Tower Bldg., 14th & K Sts., N. W., Washington, D. C.....	May 31, 1930
1, 1928	APW WASHINGTON WATER POWER CO. A. J. Turner, Box 1445, Spokane, Wash.....	Nov. 29, 1930
1, 1933	APW WATERTOWN WATER WORKS. Watertown, N. Y.....	June 8, 1909
1, 1913	WELLAND BOARD OF WATER COMMISSION. F. D. Milo, Wel- land, Ont., Canada.....	May 7, 1920
1, 1926	PW WENATCHEE WATER DEPT. Fred J. Sharkey, Supt., Wenat- chee, Wash.....	Jan. 20, 1928
1, 1912	WEST LAFAYETTE WATER WORKS CO. E. B. Vawter, Pres., 117 Vine St., West Lafayette, Ind.....	Apr. 16, 1934
1, 1928	APW WEST PALM BEACH WATER CO. J. R. Tanner, Drawer B.-25, West Palm Beach, Fla.....	Apr. 16, 1930
1, 1920	W WEST VIRGINIA WATER SERVICE CO. H. M. Cogan, Gen. Mgr., 814 Peoples Bank Bldg., Charleston, W. Va.....	Sept. 4, 1911
1, 1922	WESTMORELAND WATER CO. M. W. Crownover, Supt., 230 S. Pennsylvania Ave., Greensburg, Pa.....	June 10, 1930
1, 1921 1933 1913	W WHITBY PUBLIC UTILITY COMMISSION. Municipal Water- works Dept., Whitby, Ont., Canada.....	Feb. 23, 1924
1, 1929	WHITE DEER MOUNTAIN WATER CO. 114 S. Front St., Mil- ton, Pa.....	Mar. 5, 1914
	WHITE PLAINS DEPT. OF PUBLIC WORKS. William I. Collyer, Water Supt., White Plains, N. Y.....	July 31, 1916
	WHITTIER. M. R. Bowen, City Water Supt., City Hall, Whit- tier, Calif.....	Dec. 16, 1926

	WILLIAMSPORT WATER CO. 330 Pine St., Williamsport, Pa....	Joined Apr. 15, 1907
	WINDSOR WATER COMMISSIONERS. Windsor, Ont., Canada....	Feb. 19, 1923
APW	WINNETKA, VILLAGE OF. Ill.....	June 21, 1920
	WINONA BOARD OF MUNICIPAL WORKS. Winona, Minn.....	Dec. 11, 1922
APW	YORK, TOWNSHIP OF. O. M. Falls, Commissioner of Works, 40 Jarvis St., Toronto, Ont., Canada.....	July 16, 1932

ASSOCIATE MEMBERS

	ALLIS-CHALMERS MFG. Co. Milwaukee, Wis.....	June 24, 1905
	AMBURSEN CONSTRUCTION Co., INC. 295 Madison Ave., New York, N. Y.....	Jan. 20, 1921
	AMERICAN BRASS Co. Sales Dept., Waterbury, Conn.....	Aug. 10, 1922
	AMERICAN CAST IRON PIPE Co. P. O. Boxes 151-152, Birming- ham, Ala.....	July 18, 1907
	"AMERICAN CITY." 470 Fourth Ave., New York, N. Y.....	May 25, 1918
	AMERICAN CONCRETE PIPE ASSOCIATION. 33 W. Grand Ave., Chicago, Ill.....	Oct. 23, 1917
	AMERICAN CYANAMID & CHEMICAL CORP. 30 Rockefeller Plaza, New York, N. Y.....	June 8, 1906
	AMERICAN FOUNDRY & MFG. Co. 1015 Hebert St., St. Louis, Mo.....	May 12, 1908
APW	AMERICAN ROLLING MILL Co. R. C. Beam, Development Dept., Sales Div., Middletown, O.....	Jan. 31, 1927
	AMERICAN STEEL & WIRE Co. Chemical & Color Dept., 208 S. LaSalle St., Chicago, Ill.....	June 24, 1903
	AMERICAN WATER SOFTENER Co. Lehigh Ave. & Fourth St., Philadelphia, Pa.....	July 14, 1923
	AQUATITE Co. North Hollywood, Calif.....	May 24, 1927
	ART CONCRETE WORKS. P. O. Box 417, Pasadena, Calif.....	Dec. 13, 1920
	ATLAS MINERAL PRODUCTS Co. OF PENNSYLVANIA. Mertztown, Pa.....	May 8, 1926
PW	BABCOCK & WILCOX Co. J. B. Romer, Barberton, O.....	May 28, 1924
P	BADGER METER MFG. Co. 841-7 Thirtieth St., Milwaukee, Wis.....	June 8, 1904
	BALDWIN-SOUTHWARK CORP. Richmond & Norris Sts., Phila- delphia, Pa.....	Oct. 21, 1927
	BAYARD, M. L. 20th St. & Indiana Ave., Philadelphia, Pa....	Mar. 31, 1922
	BINGHAM & TAYLOR CORP. 575 Howard St., Buffalo, N. Y....	Mar. 15, 1882
	BIRCH MFG. Co. 1521-1523 Sedgwick St., Chicago, Ill.....	May 11, 1916
	BOURBON COPPER & BRASS WORKS Co. 618 E. Front St., Cincinnati, O.....	Apr. 17, 1884
	BUFFALO METER Co. 2917 Main St., Buffalo, N. Y.....	June 27, 1905
	BUILDERS IRON FOUNDRY. 9 Codding St., Providence, R. I....	June 18, 1901
A	BURROUGHS ADDING MACHINE Co. A. S. Trew, Public Utili- ties Sales, Second Boulevard, Detroit, Mich.....	Mar. 30, 1926
	A. M. BYERS Co. Clark Bldg., Pittsburgh, Pa.....	June 15, 1921
	CALIFORNIA CORRUGATED CULVERT Co. 5th & Parker Sts., West Berkeley, Calif.....	Aug. 24, 1927
	"CANADIAN ENGINEER." 341 Church St., Toronto, 2, Ont., Canada.....	May 31, 1916
	CENTRAL FOUNDRY Co. Graybar Bldg., 420 Lexington Ave., New York, N. Y.....	June 24, 1903
	CHAPMAN VALVE MFG. Co. Indian Orchard, Mass.....	Apr. 16, 1884
	CHASE BRASS & COPPER Co. 236 Grand St., Waterbury, Conn.	Mar. 27, 1920
	CHICAGO BRIDGE & IRON WORKS. 37 W. Van Buren St., Chi- cago, Ill.....	June 15, 1908
	CHICOPEE MFG. CORP. J. H. Fletcher, Gainesville, Ga.....	Nov. 27, 1920
	H. W. CLARK Co. Box 563, Mattoon, Ill.....	May 12, 1908
	CLOW, JAMES B., & SONS. 201 N. Talman Ave., Chicago, Ill...	Apr. 27, 1885

	Joined
P COLUMBIAN IRON WORKS. Chattanooga, Tenn.....	Apr. 27, 1910
COOK, A. D., INC. Lawrenceburg, Ind.....	June 14, 1914
APW COPPER & BRASS RESEARCH ASSOCIATION. Wm. G. Schneider, 25 Broadway, New York, N. Y.....	Aug. 28, 1923
CRANE Co. A. M. Houser, Engr. of Production, 836 S. Michi- gan Ave., Chicago, Ill.....	Jan. 25, 1926
DARLING VALVE & MFG. Co. Williamsport, Pa.....	May 12, 1908
PW DE LAVAL STEAM TURBINE Co. H. L. Watson, Sales Mgr., Trenton, N. J.....	Nov. 23, 1917
DONALDSON IRON Co. Emaus, Pa.....	Nov. 23, 1917
DORR Co., INC., THE. 247 Park Ave., New York, N. Y.....	June 1, 1927
DRESSER, S. R., MFG. Co. Bradford, Pa.....	June 7, 1904
APW EAST JERSEY PIPE Co. 7 Dey St., New York, N. Y.....	July 10, 1906
EDDY VALVE Co. Waterford, N. Y.....	June 26, 1886
P EDSON CORP. J. William Wickwire, 49-51 D St., South Bos- ton, Mass.....	Mar. 21, 1923
ELECTRO BLEACHING GAS Co. 9 E. 41st St., New York, N. Y...	Apr. 2, 1913
"ENGINEERING NEWS-RECORD." 330 W. 42nd St., New York, N. Y.....	May 31, 1918
FARNAN BRASS WORKS Co. 1104 Center St., Cleveland, O.....	May 18, 1892
FEDERAL PIPE & TANK Co. Box 505, Ballard Station, Seattle, Wash.....	Feb. 10, 1931
FORD METER BOX Co. Wabash, Ind.....	May 12, 1908
GAMON METER Co. Newark, N. J.....	May 19, 1920
GENERAL CHEMICAL Co. 300 W. Adams St., Chicago, Ill.....	June 11, 1902
GLAMORGAN PIPE & FOUNDRY Co. Lynchburg, Va.....	Nov. 6, 1907
W GREAT WESTERN ELECTRO-CHEMICAL Co. 9 Main St., San Francisco, Calif.....	Sept. 30, 1929
GRIFFIN FOUNDRY & MACHINE Co. Rome, Ga.....	June 30, 1926
GRINNELL Co., INC. P. O. Box 336, Charlotte, N. C.....	May 17, 1923
P GURLEY, W. & L. E. 514 Fulton St., Troy, N. Y.....	Apr. 16, 1919
P HANKS, FRED W., Co. Fred W. Hanks, Mgr., 10624 St. Clair Ave., Cleveland, O.....	June 5, 1926
HAYS MFG. Co. Erie, Pa.....	Mar. 15, 1882
P HENDRIE & BOLTHOFF MFG. & SUPPLY Co. James S. Smith, 1635 Seventeenth St., Denver, Colo.....	Mar. 22, 1926
P HERSEY MFG. Co. South Boston, Mass.....	July 14, 1887
HOOKE ELECTROCHEMICAL Co. G. F. Reale, 60 E. 42nd St., New York, N. Y.....	July 7, 1920
HYDRAULIC DEVELOPMENT CORP. West Medford Station, Boston, Mass.....	May 12, 1925
W INDUSTRIAL CHEMICAL SALES Co., INC. 230 Park Ave., New York, N. Y.....	May 20, 1931
INTERNATIONAL FILTER Co. 59 E. Van Buren St., Chicago, Ill.....	Nov. 3, 1915
P IOWA VALVE Co. 701 Hubbell Bldg., Des Moines, Iowa.....	Nov. 24, 1928
IPAMCO PIPE CORP. 60 E. 42nd St., New York, N. Y.....	Sept. 12, 1928
BYRON JACKSON Co. West Berkeley, Calif.....	Sept. 30, 1924
JENKINS BROS. 80 White St., New York, N. Y.....	May 20, 1920
JOHNS-MANVILLE SALES CORP. E. V. Rinehart, 22 E. 40th St., New York, N. Y.....	Mar. 31, 1933
JOHNSON, EDWARD E., INC. 2304 Long Ave., St. Paul, Minn...	May 17, 1922
KELLY WELL Co., INC. Wm. Kelly, Pres., 114½ E. Third St., Grand Island, Neb.....	Jan. 7, 1924
KENNEDY VALVE MFG. Co. M. E. Kennedy, Treas., Elmira, N. Y.....	Mar. 24, 1911
P KINNEY IRON WORKS. 2525 E. 49th St., Los Angeles, Calif...	Oct. 19, 1933
LAYNE & BOWLER Co. Memphis, Tenn.....	June 5, 1916
APW LAYNE-ATLANTIC Co. R. R. Schweitzer, Chief Engr., 633 New Monroe Bldg., Norfolk, Va.....	Apr. 16, 1930
LEAD LINED IRON PIPE Co. Wakefield, Mass.....	Oct. 5, 1898

		Joined
	LEADITE Co., THE Girard Trust Co. Bldg., Philadelphia, Pa.	Feb. 10, 1910
	LINDE AIR PRODUCTS Co., INC. H. E. Rockefeller, 30 E. 42nd St., New York, N. Y.	Mar. 31, 1928
	LOCK JOINT PIPE Co. Box 21, Ampere, N. J.	Oct. 5, 1915
	LUDLOW VALVE MFG. Co. Troy, N. Y.	Mar. 5, 1882
	LYNCHBURG FOUNDRY Co. Lynchburg, Va.	June 6, 1916
AP	M & H VALVE & FITTINGS Co. Whitfield Clark, Pres., P. O. Box 117, Anniston, Ala.	Feb. 25, 1930
P	MABBS HYDRAULIC PACKING Co. 431 S. Dearborn St., Chicago, Ill.	May 7, 1923
	MATHIESON ALKALI WORKS, INC. 250 Park Ave., New York, N. Y.	Mar. 16, 1920
	MCCLINTIC-MARSHALL CORP. J. A. Nelson, Bethlehem, Pa.	Jan. 9, 1930
	MCWANE CAST IRON PIPE Co. Birmingham, Ala.	Apr. 23, 1923
	MODERN IRON WORKS. Quincy, Ill.	June 27, 1905
W	MONSANTO CHEMICAL Co. 1724 S. Second St., St. Louis, Mo.	May 31, 1933
	MORRIS MACHINE WORKS. Baldwinsville, N. Y.	July 31, 1923
	MUELLER Co. Decatur, Ill.	Mar. 15, 1882
	MULTIPLEX MFG. Co. Multiplex Bldg., Berwick, Pa.	May 7, 1916
W	NATIONAL ALUMINATE CORP. 6216 W. 66th Place, Chicago, Ill.	June 21, 1926
	NATIONAL CAST IRON PIPE Co. Paul A. Ivy, Vice-Pres., Birmingham, Ala.	May 17, 1916
	NATIONAL METER Co. 4207 First Ave., Brooklyn, N. Y.	Mar. 15, 1882
	NATIONAL TUBE Co. W. L. Schaeffer, 1902 Frick Bldg., Pittsburgh, Pa.	May 18, 1921
	NATIONAL WATER MAIN CLEANING Co. 50 Church St., New York, N. Y.	July 10, 1906
	NAYLOR PIPE Co. 1230 E. 92nd St., Chicago, Ill.	Oct. 14, 1931
	NEPTUNE METER Co. 50 W. 50th St., New York, N. Y.	Aug. 22, 1894
PW	OLYMPIC FOUNDRY Co. 5200—9th St., South, Seattle, Wash.	Feb. 26, 1931
	PACIFIC STATES CAST IRON PIPE Co. P. O. Box 18, Provo, Utah.	Oct. 31, 1927
	PAPER MAKERS CHEMICAL CORP. Atlanta, Ga.	July 31, 1928
W	PARDEE ENGINEERING Co. 3915—29th St., Long Island City, N. Y.	Mar. 15, 1930
	PARSONS, KLAPP, BRINCKERHOFF & DOUGLAS. Cons. Engrs., 142 Maiden Lane, New York, N. Y.	July 26, 1922
	PEERLESS PUMP Co. P. O. Box 493, Massillon, O.	June 6, 1927
	PENNSYLVANIA SALT MFG. Co. Widener Bldg., Philadelphia, Pa.	June 24, 1903
	PHOENIX METER CORP. 147 Waterbury Ave., Prince's Bay, S. I., N. Y.	May 11, 1927
	PITOMETER Co., THE. 50 Church St., New York, N. Y.	July 10, 1906
	PITTSBURGH-DES MOINES STEEL Co. Pittsburgh, Pa.	Apr. 14, 1914
	PITTSBURGH EQUITABLE METER Co. Wilksburg Branch P. O., Pittsburgh, Pa.	June 15, 1898
	PNEUMATIC MACHINERY Co. F. F. Costello, 2305 E. 8th St., Los Angeles, Calif.	Oct. 1, 1934
	POLLARD, JOS. G., Co., INC. 142 Raymond St., Brooklyn, N. Y.	Apr. 30, 1926
	POMONA PUMP Co. 206 E. Commercial St., Pomona, Calif.	May 24, 1927
	"PUBLIC WORKS." 310 E. 45th St., Allied Arts Bldg., New York, N. Y.	May 25, 1918
	R. U. V. Co., INC. 110 E. 42nd St., New York, N. Y.	June 6, 1917
PW	READING IRON Co. G. H. Woodroffe, Metallurgical Engr., 401 N. Broad St., Philadelphia, Pa.	Oct. 17, 1932
W	REFINITE Co., THE. 1023 Harney St., Omaha, Neb.	Apr. 4, 1932
P	RELIABLE IRON FOUNDRY. 1583 Fishburn St., Los Angeles, Calif.	July 1, 1934
	RENSSELAER VALVE Co. Troy, N. Y.	May 12, 1890

	Joined
P REPUBLIC STEEL CO. L. S. Hamaker, Mgr., Sales Promotion Div., Republic Bldg., Youngstown, O.	Apr. 13, 1932
RICH MFG. CO., LTD. E. F. Alt, Sales Mgr., 3851 Santa Fe Ave., Los Angeles, Calif.	Sept. 26, 1927
W ROBERTS FILTER MFG. CO. Darby, Philadelphia, Pa.	Mar. 23, 1910
P ROME BRASS & COPPER CO. Rome, N. Y.	Aug. 31, 1928
ROSS VALVE MFG. CO., INC. Oakwood Ave., Troy, N. Y.	Apr. 18, 1891
AP RUDISILL FOUNDRY CO. P. O. Box 137, Anniston, Ala.	June 29, 1933
SANTA FE PIPE & SUPPLY CO. 2451 E. 15th St., Los Angeles, Calif.	May 31, 1930
SIMPLEX VALVE & METER CO. 6759 Upland St., Philadelphia, Pa.	May 14, 1914
APW SMITH, A. P., MFG. CO. East Orange, N. J.	June 7, 1897
W SMITH, S. MORGAN, CO. York, Pa.	Mar. 30, 1934
AP SPARLING, R. W. 945 N. Main St., Los Angeles, Calif.	Nov. 10, 1925
P STEEL TANK & PIPE CO. OF CALIF. 1100 Fourth St., Berkeley, Calif.	Aug. 23, 1926
THOMSON METER CO. 50 W. 50th St., New York, N. Y.	Apr. 15, 1891
TROHN'S SUPPLIES, INC. Stanley & Maple Aves., Mamaroneck, N. Y.	May 9, 1931
UNION WATER METER CO. 33 Hermon St., Worcester, Mass.	Mar. 15, 1882
UNITED CONCRETE PIPE CO. Box 1, Station H., Los Angeles, Calif.	Sept. 30, 1929
U. S. ELECTRICAL MFG. CO. 200 E. Slauson Ave., Los Angeles, Calif.	Oct. 1, 1934
P UNITED STATES PIPE & FOUNDRY CO. Thomas Simons, Southern Sales Mgr., 1711 American-Traders Bank Bldg., Birmingham, Ala.	Nov. 19, 1929
UNITED STATES PIPE & FOUNDRY CO. 1421 Chestnut St., Philadelphia, Pa.	June 11, 1892
PW UNIVERSAL GEAR CORP. 19th & Martindale Ave., Indianapolis, Ind.	May 18, 1934
VERNON FOUNDRY, INC. A. J. Muhlbach, Sect. & Gen. Mgr., Hollydale, Calif.	Oct. 4, 1932
P VICTAULIC CO. OF AMERICA. 26 Broadway, New York, N. Y.	Apr. 13, 1926
PW VOGT BROTHERS MFG. CO. 1402 W. Main St., Louisville, Ky.	May 12, 1925
WAILES DOVE-HERMISTON CORP. 17 Battery Place, New York, N. Y.	Mar. 13, 1925
WALLACE & TIERNAN CO., INC. Box 178, Newark, N. J.	Apr. 23, 1915
WARREN FOUNDRY & PIPE CORP. 11 Broadway, New York, N. Y.	Mar. 4, 1911
"WATER WORKS & SEWERAGE." Chicago Daily News Bldg., Chicago, Ill.	June 30, 1929
"WATER WORKS ENGINEERING." 24 W. 40th St., New York, N. Y.	June 28, 1919
WATER WORKS SUPPLY CO. 501 Howard St., San Francisco, Calif.	Apr. 12, 1928
WESTERN CONSTRUCTION PUBLICATIONS, INC. 114 Sansome St., San Francisco, Calif.	Apr. 6, 1928
WESTERN GAS CONSTRUCTION CO. Fort Wayne, Ind.	June 29, 1933
WESTERN PIPE & STEEL CO. OF CALIF. 444 Market St., San Francisco, Calif.	Aug. 13, 1924
P WOOD, R. D., Co. 400 Chestnut St., Philadelphia, Pa.	Apr. 16, 1884
WORTHINGTON PUMP & MACHINERY CORP. 2 Park Ave., New York, N. Y.	June 18, 1901

GEOGRAPHICAL DISTRIBUTION

ALABAMA

Active 5; Corporate 1; Associate 6;
Total 12

ACTIVE

Birmingham: Decker, Rather, Sweet
Montgomery: Hazlehurst
Talladega: Dougherty

CORPORATE

Guntersville: Guntersville Water Works

ASSOCIATE

Anniston: M & H Valve & Fittings Co., Rudisill Foundry Co.
Birmingham: American Cast Iron Pipe Co., McWane Cast Iron Pipe Co., National Cast Iron Pipe Co., United States Pipe & Foundry Co.

ARIZONA

Active 4; Total 4

ACTIVE

Flagstaff: Weidner
Phoenix: Ames
Tucson: Martin, Jr., Rider

ARKANSAS

Active 5; Corporate 2; Total 7

ACTIVE

Fayetteville: Ratliff
Fort Smith: Vaughn
Hazen: Sickel
Jonesboro: Christy, Rebsamen

CORPORATE

Hot Springs: Hot Springs Water Co.
Pine Bluff: Arkansas Power & Light Co.

CALIFORNIA

Honorary 1; Active 240; Corporate 25;
Associate 19; Total 285

HONORARY

Los Angeles: Mulholland

ACTIVE

Alhambra: Arnold, Downer, Goble
Altadena: Francis

Arcadia: Lee

Bakersfield: Dillon

Berkeley: Foreman, Gillespie, Graham, Gray, Hyde, Jenks, Langelier, Reinke, Scobey, Stava

Burbank: Finkle

Burlingame: Schuck

Campbell: Hyde

Chico: Camy

Concord: Blumberg

Corona: Case

Fontana: Hasbrouck

Fullerton: Walters

Glendale: Lane

Hanford: Isaac

Hayward: Smalley

Hollister: Briggs

Independence: Lewis, Ritch

Lafayette: Sturgeon

Lindsay: Trauger

Long Beach: Brown, Harmon, Porter

Los Angeles: Anderson, Angilly,

Bayley, Bennett, Benson, Bliss,

Brady, Bredehoft, Breikreutz,

Brooks, Brown, Cates (R. H.),

Cates (Walter H.), Chamberlain,

Chapin, Copeland, Derby, Dickey,

Dodge, Dudley, Dunn, Dunstan,

Egan, Elder, Erwin, Fenton,

Fischer, Fitzgerald, Ford, Galvin,

Gemperle, Goudey, Grant, Hacker,

Harnish, Hayes, Heddell, Hill,

Hinds, Hubbard, Hurlbut, Jacques,

Jewett, Jones (James E.), Jones

(W. B.), Keene, Kivari, Koebig, Jr.,

Koster, Lavelle, Lawton, Luippold,

Mattoon, Mayer, Manock, North-

rop, Owens, Parratt, Phillips,

Proctor, Read, Rosenberg, Rowe,

Ruckman, Rutledge, Sanders,

Shoner, Slane, Slater (E. O.),

Slater (L. N.), Socha, Sonderegger,

Sparks, Stead, Stevenson, Taylor,

Thacker, Van Giesen, Volk, Wall,

Whitman, Whitaker, Whittier,

Wilson

Martinez: Duncan

Marysville: Stolp

Merced: Casad

Millbrae: Arnold

National City: Rice

Newport Beach: Patterson

Niles: Glassbrook
 North Hollywood: Owen
 Oakland: Daniels, DeCosta, Driggs,
 Faw, Forgey, Grunsky, Jr., Hall,
 Hunter, Jordan, Kennedy, Kimball,
 Longwell, Manbert, Moullet,
 Stevens, Storrs, Thatcher, Traver
 Ontario: Burt
 Pacific Grove: Scripture
 Palo Alto: Marx, McMillan, Noble
 Palos Verdes Estates: Holden
 Pasadena: Allin, Jones, Morris,
 Stone, Thomas
 Petaluma: Ellsworth
 Pomona: Pedley
 Redding: Steinhauer
 Redondo Beach: Nutting
 Reward: Willis
 Sacramento: Hawley, Hoskinson,
 Klaus
 San Diego: Symons, Williams,
 Wueste
 San Francisco: Abbott, Andrews,
 Badger, Barker, Bauer, Beeny, Bell,
 Beyer, Bovard, Bragg, Brune, Bur-
 nett, DeMartini, Eckart, Elliott
 (Earl C.), Elliott (G. A.), Ellis, Flaa,
 Griffin, Harris, Hausmann, Hom-
 mon, Hostrup, Hunter, Kempkey,
 Kennedy, Lee, Loveland, Martin-
 dale, O'Shaughnessy, Parker,
 Perry, Pracy, Randlett, Reinhardt,
 Renshaw, Sharon, Smith, Starke,
 Stocker, Wade, Walthall,
 San Jose: Ford, Green, Relph
 San Leandro: Taylor
 San Mateo: Jackson
 San Pedro: Monro
 San Rafael: Burt, Everette, Peters
 Santa Barbara: Wyant
 Santa Clara: Dixon
 Santa Cruz: Tait
 South Pasadena: Mudge
 Stanford University: Reynolds
 Stockton: Brown (Kenneth W.),
 Brown (Robert F.), Villarruz
 Tulare: Brown
 Tustin: Browning
 Upland: Ward
 Van Nuys: Bouey
 Ventura: Mieldazis
 Vernon: McCurdy
 Watsonville: Kitchen
 Wilmington: Golden, Norton, Shull,
 Townsend, Van Meter
 Yorba Linda: Lewis
 Yreka: Thomas

CORPORATE

Altadena: Rubio Canon Land &
 Water Association

Beverly Hills: Water Dept.
 Burbank: Public Service Dept.
 Fresno: Water Dept.
 Glendale: Public Service Dept.
 Hollister: Hollister Water Co.
 Laguna Beach: Laguna Beach
 County Water District
 Lompoc: Light & Water Dept.
 Long Beach: Water Dept.
 Los Angeles: American States Public
 Service Co., Dept. of Water &
 Power
 Menlo Park: Bear Gulch Water Co.
 National City: Coronado Water Co.,
 Sweetwater Water Corp.
 Oakland: East Bay Municipal Utility
 District
 Pasadena: Water Dept.
 Pittsburg: Water Dept.
 Riverside: Water Dept.
 Sacramento: Division of Water
 San Bernardino: Board of Water
 Commissioners
 San Francisco: Water Dept.
 San Jose: Water Works
 Santa Monica: Water Dept.
 Whittier: Hillside Distribution Co.,
 Water Dept.

ASSOCIATE

Berkeley: Steel Tank & Pipe Co. of
 Calif.
 Hollydale: Vernon Foundry, Inc.
 Los Angeles: Kinney Iron Works,
 Pneumatic Machinery Co., Reliable
 Iron Foundry, Rich Mfg. Co., Ltd.
 Santa Fe Pipe & Supply Co., R. W.
 Sparling, United Concrete Pipe Co.,
 U. S. Electrical Mfg. Co.
 North Hollywood: Aquatite Co.
 Pasadena: Art Concrete Works
 Pomona: Pomona Pump Co.
 San Francisco: Great Western Elec-
 tro-Chemical Co., Water Works
 Supply Co., Western Construction
 Publications, Inc., Western Pipe &
 Steel Co. of Calif.
 West Berkeley: California Corru-
 gated Culvert Co., Byron Jackson
 Co.

COLORADO

Active 24; Corporate 7; Associate 1;
 Total 32

ACTIVE

Colorado Springs: Truman
 Denver: Bardwell, Brown, Gross,
 Hanks, Howe, Kepner, Lowther,
 Mars, Jr., McLaughlin, Mulligan,
 Turre, Wilson
 Estes Park: Tallant
 Grand Junction: Soderstrum

Gunnison: Keenan
 Julesburg: Charles
 Leadville: Sharp
 Littleton: Ripple
 Longmont: Price
 Montrose: Smith
 Palisades: Nisbet
 Pueblo: Porter, Wagner

CORPORATE

Boulder: Water Dept.
 Canon City: Water Dept.
 Denver: Board of Water Commissioners
 Fort Collins: City of Fort Collins
 Greeley: City of Greeley
 La Junta: City of La Junta
 Loveland: City of Loveland

ASSOCIATE

Denver: Hendrie & Bolthoff Mfg. & Supply Co.

CONNECTICUT

Active 19; Corporate 3; Associate 2;
 Total 24

ACTIVE

Ansonia: Bristol, Davis
 Bridgeport: Senior
 Bristol: Lourie
 Greenwich: Putnam, Willson
 Hartford: Dillon, Griswold, Newlands, Peck, Saville, Scott
 New Haven: Marchant, Minor, Winslow
 Naugatuck: Ham
 Stamford: Ketcham
 Thompsonville: Schwabe
 Torrington: Travis

CORPORATE

Derby: Birmingham Water Co.
 Hartford: Public Utilities Commission
 Middletown: Water Works

ASSOCIATE

Waterbury: American Brass Co., Chase Brass & Copper Co.

DELAWARE

Active 8; Total 8

ACTIVE

Dover: Beckett
 Wilmington: Crichton, Doto, Fee-ney, Maroney, Rode, Van Sciver, Wills

DISTRICT OF COLUMBIA

Active 12; Corporate 2; Total 14

ACTIVE

Washington: Brumbaugh, Collins, Curtis, Dangler, Dixon, Dorsey, Fiedler, Holton, Lauter, MacQueen, Sherman, Thompson

CORPORATE

Washington: District of Columbia Water Dept., Washington Suburban Sanitary Commission

FLORIDA

Active 27; Corporate 3; Total 30

ACTIVE

Daytona Beach: Asbell, Miller
 Fort Lauderdale: Chalfant
 Gainesville: Black
 Jacksonville: Hoy, Lenert, Smith
 Miami: Culter, Hyman
 Ocala: Wallace
 Orlando: Croll, Grant, Jr., Michaels, Rhynus
 Plant City: Tyner
 St. Petersburg: Lane, Ridgely
 Stuart: DeMoya
 Tallahassee: Gunter
 Tampa: Jones, Long, Lyles, Rankin, Wilder
 West Palm Beach: Chinn, Conk, Reynolds

CORPORATE

Gainesville: City of Gainesville
 Orlando: Orlando Utilities Commission
 West Palm Beach: West Palm Beach Water Co.

GEORGIA

Active 50; Corporate 2; Associate 3;
 Total 55

ACTIVE

Athens: Beacham
 Atlanta: Cates, DeJarnette (L. W.), DeJarnette (N. M.), Ford, Jr., Grimes, Hall, Hansell, Hicklin, Kahn, Norris, Rapp, Weir (Paul), Weir (W. H.), Wiedeman, Wilcox
 Augusta: Cooper, Smith, Twigg
 Barnesville: Battson
 Blakely: Killebrew
 Brunswick: Killian
 Cairo: Clifford
 Canton: Groves
 Cedartown: Rainwater
 College Park: Whelchel
 Columbus: Avirett, Jordan, Smalshaf
 Cornelia: Cook
 Decatur: Carey, Hancock

East Point: Hutcheson
 Elberton: Wallis
 Gainesville: Goudelock
 Griffin: Simonton
 LaFayette: Jarrett
 LaGrange: Sargent
 Macon: Findlay
 Marietta: Cannon
 Moultrie: Lang
 Newnan: Passolt
 Rome: Alexander, Frye,
 Savannah: East
 Thomaston: George, Lewis
 Thomasville: Dawes, Pringle
 Vidalia: Henderson

CORPORATE

Griffin: Light, Water & Sewerage
 Dept.
 Macon: Board of Water Commis-
 sioners

ASSOCIATE

Atlanta: Paper Makers Chemical
 Corp.
 Gainesville: Chicopee Mfg. Corp.
 Rome: Griffin Foundry & Machine
 Co.

IDAHO

Active 11; Corporate 1; Total 12

ACTIVE

Lewiston: Anderson, Hughes, Kopel-
 man, Mounce, Schenk, Turnbull,
 Wilson
 Moscow: Hill
 Orofino: Hallam
 Pocatello: Rainey
 Twin Falls: Walter

CORPORATE

Boise: Idaho Surveying & Rating
 Bureau

ILLINOIS

Honorary 2; Active 141; Corporate 7;
 Associate 15; Total 165

HONORARY

Chicago: Alvord
 Urbana: Talbot

ACTIVE

Aurora: Barclay, Sperry, Willett
 Bloomington: Woltman
 Blue Island: Bender
 Brookfield: Krause
 Cairo: Roos, Shoemaker
 Carbondale: Gill
 Champaign: Amsbary, Jr.
 Chicago: Abplanalp, Allen, Bach-

mann, Baylis, Behrman, Birdsall,
 Birkeness, Burdick, Connolly,
 Coughlan, Cullen, DeBerard, Don-
 ahue, Eddy, Enander, Engel, Fager,
 Fink, Fishtein, Friend, Fulkman,
 Gayton, Gerstein, Goldsmith, Gor-
 don, Gorman, Greeley, Green,
 Groner, Grossman, Gullans, Han-
 cock, Hansen, Harris, Hartmann,
 Hendricks, Hickox, Holmes, Horst-
 mann, Howson, Hudson, Jr., Jewell
 (G. H.), Jewell (Ira H.), Johnson,
 Judge, Knowles, Maxwell, McClen-
 ahan, Mohlman, Moore, Munn,
 Noble, Pearse, Powrie, Ramey,
 Reynolds, Riedel, Robinson, Ruch-
 hof, Sanders, Shaw (Frank R.),
 Shaw (Walter A.), Sherman,
 Shields, Skinner, Snow, Storms,
 Stanley, Strasser, Sybrandt, Tat-
 nall, Tonney, Versluis, Waller,
 Williams, Wolfe

Cicero: Broz

Danville: Ely, Symons

Decatur: Greenfield, Hatfield

Dixon: Coe

East St. Louis: Horner

Elgin: Scarritt

Evanston: Frye, Moseley, Polk

Freeport: Hutchins

Geneva: Hellstrom

Glencoe: Young

Harvey: Ginter

Herrin: Misker

Highland: Callaghan

Highland Park: Prindle

Jacksonville: Stoldt, Swanson

Kankakee: Huse

LaGrange: Partridge

Lockport: Manning

Mattoon: McClintock

Oak Park: Davidson, Meyers

Pana: Stanfield

Pekin: Lautz

Peoria: Berg, Crozier, Ringness

Quincy: Gelston

Rockford: Giesey

Salem: Denton

Springfield: Black, Ferguson, Spaul-
 ding

Sterling: MacDonald

Streator: Huggans

Taylorville: Dappert

Urbana: Babbitt, Buswell, Doland,

Enger, Fleming, Gerber, Imbt,

Suter, White

Wilmette: Olson, Osborn

Winnetka: French, Leopold

Woodstock: Clark

Zion: Craig

CORPORATE

Chicago: Illinois Inspection Bureau
 Lake Forest: Water Dept.
 Moline: Water Dept.
 Peoria: Peoria Water Works Co.
 Quincy: Water Works Commission
 Springfield: Willis J. Spaulding
 Winnetka: Village of Winnetka

ASSOCIATE

Chicago: American Concrete Pipe Association, American Steel & Wire Co., Birch Mfg. Co., Chicago Bridge & Iron Works, James B. Clow & Sons, Crane Co., General Chemical Co., Mabbs Hydraulic Packing Co., International Filter Co., National Aluminate Corp., Naylor Pipe Co., "Water Works & Sewerage"

Decatur: Mueller Co.
 Mattoon: H. W. Clark Co.
 Quincy: Modern Iron Works

INDIANA

Active 50; Corporate 4; Associate 4;
 Total 58

ACTIVE

Crothersville: Bridges
 Elkhart: Littrell
 Fort Wayne: Hosey, Yobst
 Frankfort: Stern
 Gary: Crane
 Greensburg: Jones
 Hammond: Besozzi, Davis
 Indianapolis: Boggs, Brossman, Bruhn, Calvert, Carter, Cruger, Finch, Garman, Geupel, Hurd, Jeup, Jordan (Frank C.), Jordan (Harry E.), Mabee, Mauch, Morse, Niemeyer, Pierce, Rupard, Schwier, Winkle
 Kokomo: Stradling
 LaPorte: Foutz
 Lebanon: Ridgway
 Michigan City: Gale
 Muncie: Stewart
 New Albany: Younce
 Newcastle: Scholl
 Osgood: Brook
 Richmond: Dill
 Rockport: Huffman
 Rushville: Petry
 Sullivan: Kerlin
 Tell City: Weisenberger
 Terre Haute: Durbin
 Valparaiso: Bradley, Kamplain
 Vincennes: Schwartz
 West Lafayette: Howland, Wiley
 Whiting: Bartuska

CORPORATE

Evansville: Water Works
 Indianapolis: Bureau of Sanitary Engineering, Public Service Co. of Indiana
 West Lafayette: West Lafayette Water Works Co.

ASSOCIATE

Fort Wayne: Western Gas Construction Co.
 Indianapolis: Universal Gear Corp.
 Lawrenceburg: A. D. Cook, Inc.
 Wabash: Ford Meter Box Co.

IOWA

Honorary 1; Active 38; Corporate 1;
 Associate 1; Total 41

HONORARY

Davenport: Donahue

ACTIVE

Boone: Nelson
 Burlington: Lawlor
 Carroll: Badley
 Cedar Rapids: Blomquist
 Centerville: Alexander
 Clinton: Meeker
 Council Bluffs: Bailey, Hansen, Jensen, Maloney
 Creston: Smith
 Davenport: Henderson
 Des Moines: Maffitt (Dale L.), Maffitt (Howard C.), Tenny, Wieters
 Dubuque: McEvoy
 Fort Dodge: Bird, Pray
 Iowa City: Bartow, Hinman, Jr., Hostetler, Keller, Mathews, Mavis, Waterman
 Marion: Toms
 Marshalltown: Pedersen
 Mason City: Crofoot
 Muscatine: Molis, Stanley
 Oskaloosa: Trueblood
 Ottumwa: Brown, Elliott
 Sioux City: Carlin, Smith, Sutherland
 Waterloo: Shoemaker

CORPORATE

Muscatine: Water Trustees

ASSOCIATE

Des Moines: Iowa Valve Co.

KANSAS

Active 10; Corporate 2; Total 12

ACTIVE

Atchison: Weatherford
 Junction City: Rathert

Kansas City: Mangun
Lawrence: Boyce, Gottlieb
Manhattan: Ulrich
Salina: Lamme
Topeka: Huffman, Rupp
Wichita: Kelley

CORPORATE

Lawrence: Water Dept.
Salina: Water Dept.

KENTUCKY

Active 23; Corporate 6; Associate 1;
 Total 30

ACTIVE

Ashland: Patton, Powell
Carlisle: Clay
Catlettsburg: Stout
Danville: Wyatt
Harrodsburg: Johnson
Lexington: Beck, Bell, Cramer,
 Jacobson, Watkins
Louisville: Chambers, Lovejoy, Mc-
 Gonigale, Overstreet, Peabody,
 Stover
Madisonville: Arnold
Mayfield: Orr
Maysville: Duke
Owensboro: Clark
Richmond: Dougherty
Winchester: Attersall

CORPORATE

Bowling Green: Kentucky-Tennessee
 Light & Power Co.
Covington: J. T. Kingsley
Lexington: Kentucky Utilities Co.
Louisville: State Board of Health,
 Louisville Water Co.
Paducah: Water Works

ASSOCIATE

Louisville: Vogt Brothers Mfg. Co.

LOUISIANA

Honorary 1; Active 11; Corporate 1;
 Total 13

HONORARY

New Orleans: Earl

ACTIVE

Hammond: Mentz
New Orleans: Earl, Fowler, Grant,
 Haas, Morales, Old, O'Neill, Vallas
Shreveport: Amiss, Dickson

CORPORATE

Baton Rouge: Baton Rouge Water
 Works Co.

MAINE

Active 8; Corporate 1; Total 9

ACTIVE

Augusta: Campbell
Bangor: Powell
Portland: Coburn, Fuller, West
 (Geo F.), West (Vernon F.)
Rockland: McAlary
Sanford: Clark

CORPORATE

Waterville: Kennebec Water District

MARYLAND

Active 25; Total 25

ACTIVE

Annapolis: Donaldson, Munroe
Baltimore: Armstrong, Bingley,
 Blohm, DiDomenico, Flack, Gre-
 gory, Holland, Hopkins, Powell,
 Requardt, Smith, Strohmeier,
 Whitman, Wolman
Cambridge: Cronister
Cockeysville: Cornell
Hagerstown: Heard
Hyattsville: Devilbiss, Hall, Hech-
 mer, Morse
Luke: Patrick
Riverdale: Owings

MASSACHUSETTS

Honorary 4; Active 59; Associate 6;
 Total 69

HONORARY

Boston: Goodnough, Weston
Holyoke: Tighe
Lowell: Thomas

ACTIVE

Acushnet: Sorelle
Boston: Barbour, Chase, Clark, Cur-
 tis, Eddy, Eddy, Jr., Ellsworth,
 Fales, Finneran, French, Haley,
 Halpin, Horne, Howard, Killam,
 Marston, McInnes, Mowry, Pratt,
 Shaw, Sherman, Skinner, Stewart,
 Taber, Wentworth (Franklin H.),
 Wentworth (John P.), Weston,
 Winsor
Brockton: Kingman
Brookline: Houser
Cambridge: Camp, Edwards, Fair,
 Good, Whipple
Concord: Robinson
Danvers: Esty
Enfield: Stalbird

Fairhaven: Gidley
 Framingham: Reed
 Greenfield: Field
 Holyoke: Gear
 Leominster: Classon
 Lowell: Emerson, Safford
 Medford: Dwyer
 Milton: Heffernan
 New Bedford: Chase, Taylor
 Newton: Howes
 Sandwich: Chase
 Southbridge: Abbott
 Springfield: Lochridge
 Wellesley: Adams
 Woburn: Macksey
 Worcester: Goodale, Hoy, Lingley

ASSOCIATE

Boston: Edson Corp., Hersey Mfg.
 Co., Hydraulic Development Corp.
 Indian Orchard: Chapman Valve
 Mfg. Co.
 Wakefield: Lead Lined Iron Pipe Co.
 Worcester: Union Water Meter Co.

MICHIGAN

Active 40; Corporate 4; Associate 1;
 Total 45

ACTIVE

Adrian: Snedeker
 Ann Arbor: Ayres, Decker, Hoad,
 McNamee
 Bay City: Harrison
 Benton Harbor: Jones, Wightman
 Cadillac: Webb
 Coldwater: McQueen
 Dearborn: McCarthy
 Detroit: Bird, Dow, Dunham, Fen-
 kell, Grobbel, Hulbert, Knight,
 Lenhardt, Outzen, Wallace,
 Wyckoff
 East Dearborn: Hardin, Rudd
 Grand Rapids: Grinnell
 Hillsdale: Board
 Iron Mountain: Senseman
 Kalamazoo: Libby, Norman, Norton
 Ludington: Williams
 Melvindale: MacDonald
 Monroe: Weaver
 Mt. Clemens: Keils
 Pontiac: Monroe
 Port Huron: Sterosky
 Saginaw: Eckert, Eymer, Richard-
 son
 Wyandotte: Allen

CORPORATE

Ann Arbor: Water Works Commission
 Flint: Board of Water Commissioners

Grand Rapids: Dept. of Public Serv-
 ice
 Lansing: Board of Water & Electric
 Light Commissioners

ASSOCIATE

Detroit: Burroughs Adding Machine
 Co.

MINNESOTA

Active 35; Corporate 4; Associate 1;
 Total 40

ACTIVE

Duluth: Foster, Seligman
 Ely: Buccowich, Jr.
 Eveleth: Stauff
 Fairmont: Basom
 Faribault: Wilson
 Fridley: Johnson
 Gilbert: Spitznagle
 Hibbing: Forsberg
 Minneapolis: Bass, Beal, Bell,
 Brownell, Finch, Janzig, Jensen,
 Lundell, Mellen, Montank, Poole,
 Raab, Smith, Whittaker, Wilbur
 Rochester: Schwarz
 St. Cloud: Seibert
 St. Paul: Crowley, Druar, Feist,
 Grime, Rosen, Shepard, Thompson,
 Thuma, Wenzel

CORPORATE

Minneapolis: Fire Underwriters In-
 spection Bureau, Committee on
 Water Works
 St. Paul: Board of Water Commis-
 sioners
 Winona: Board of Municipal Works

ASSOCIATE

St. Paul: Edward E. Johnson, Inc.

MISSISSIPPI

Active 6; Total 6

ACTIVE

Amory: Miller
 Clarksdale: Pointer
 Jackson: Fewell
 Meridian: May
 Natchez: Stewart
 Vicksburg: Tvargosky

MISSOURI

Active 45; Corporate 1; Associate 2;
 Total 48

ACTIVE

Chesterfield: Graf
 Hannibal: Wolfe

Independence: Gallagher

Jefferson City: Bosch, Helmreich

Kansas City: Archer, Bacharach,
Baldwin, Black, Crist, Filby, Fore-
man, Haskins, Joslyn, Lambert,
Learned, McDonnell, Mullergren,
Reynolds, Samuel, Jr., Smith,
Timanus, Veatch, Jr.

St. Joseph: Bodkin, Smouse, Jr.

St. Louis: Allgeyer, Cutts, Daily,
Dean, Easterday, Johnson, Jutz,
Kramer, Meyer, Nolte, Pritchard,
Quirk, Rilliet, Jr., Skinker,
Wachter, Wall

Sedalia: Andrews

Springfield: Everett

University City: Schaum, Weir

CORPORATE

Kansas City: Water Dept.

ASSOCIATE

St. Louis: American Foundry & Mfg.
Co., Monsanto Chemical Co.

MONTANA

Active 26; Corporate 3; Total 29

ACTIVE

Baker: Corbett

Billings: Hewett

Bozeman: Cobleigh

Butte: Carroll, Plummer

Chinook: Brandis

Columbus: McClure

Deer Lodge: Brennan, Vrooman

Dillon: Bayerd

Forsyth: Palmer

Gardiner: Lauer

Glasgow: Arnold

Glendive: Eyer

Great Falls: Sandquist, Thomas

Hardin: Young

Helena: Cogswell, Foote

Lewistown: Schmit

Livingston: Cortese

Miles City: Stewart, Wiel

Missoula: Christensen, Thane

Roundup: Quinnell

CORPORATE

Anaconda: Anaconda Copper Mining Co.

Bozeman: Water Dept.

Great Falls: Water Dept.

NEBRASKA

Active 7; Corporate 2; Associate 2;
Total 11

ACTIVE

Fremont: Henry

Lincoln: Erickson

Omaha: Bunnell, Detweiler, Lasell,
Leisen

Plattsmouth: Minor

CORPORATE

Lincoln: Water & Lighting Dept.

Omaha: Metropolitan Utilities
District**ASSOCIATE**

Grand Island: Kelly Well Co., Inc.

Omaha: Refinite Co.

NEVADA

Active 1; Corporate 1; Total 2

ACTIVE

Virginia City: Leonard

CORPORATE

Reno: Sierra Pacific Power Co.

NEW HAMPSHIRE

Active 4; Corporate 1; Total 5

ACTIVE

Concord: Howard

Cornish: Bedell

Hanover: Kimball

Manchester: Shaw

CORPORATE

Nashua: Pennichuck Water Works

NEW JERSEY

Active 86; Corporate 7; Associate 5;
Total 98

ACTIVE

Ampere: Longley

Atlantic City: Van Gilder, Wigley

Bayonne: Klinger

Beverly: Horan

Bound Brook: Brush

Burlington: Conard, Russell

Camden: Sleeper

Collingswood: Borden

East Orange: Emerson, Jr., Halpin,
Klein, RoperElizabeth: Booth, Buck, Newkirk,
Jr., Radcliffe, Townley

Franklin: Jenkins

Glen Ridge: Wilson, Worden

Haddon Heights: Moon

Harrison: Matte, Sizer

Highland Park: Malmros, Jr.

Jersey City: Foster, Jewell, Mauzy

Little Falls: Green

Lodi: McClellan
Long Branch: Herr
 Merchantville: Rudderow
 Millville: Buell
 Montclair: Baker, Knox, Wilson
 Morristown: Hoffman
 Newark: Bank, Garratt, Hutton,
 Merkel, Orchard, Pratt, Rosen-
 treter, Scherer
New Brunswick: Atkinson, End,
 Lendall
New Milford: Cowles, Spalding
 Ocean City: Steelman
 Orange: Luthy
 Palmyra: Hargett
 Park Ridge: Smith
 Passaic: Hopper
 Paterson: Cook (Arthur T.), Cook
 (John H.), Ryle
 Perth Amboy: Mason
 Plainfield: Gavett
 Pompton Plains: Griffin, Holdredge,
 Ward
 Princeton: Eldridge
 Rahway: Gibbons
 Red Bank: Cadman
 Ridgewood: Carr, Weed
 South Orange: Smith
 Summit: Bassett
 Trenton: Critchlow
 Wanaque: Purcell
 Weehawken: Alfke, Cady, Fricker,
 Lebold, Schlicht, Schwartz, Talbot
 West Englewood: Wieghardt
 Westfield: Haskew
 West Orange: Capen, Jr., Fritz,
 Glannan
Woodbridge: Mundy

CORPORATE

Dover: Dover Water Commissioners
 Glen Ridge: Water Dept.
 Haddon Heights: New Jersey Water
 Co.
 Merchantville: South Jersey Associa-
 tion of Water Superintendents
 Millville: Millville Water Co.
 Mount Holly: Mount Holly Water
 Co.
 Trenton: Water Works

ASSOCIATE

Ampere: Lock Joint Pipe Co.
 East Orange: A. P. Smith Mfg. Co.
 Newark: Gamon Meter Co., Wallace
 & Tiernan Co., Inc.
 Trenton: DeLaval Steam Turbine
 Co.

NEW MEXICO

Active 5; Corporate 3; Total 8

ACTIVE

Cimarron: Alpers
 Clayton: Callahan
 Gallup: Caldwell
 Raton: Palmes
 Santa Fe: Fox

CORPORATE

Deming: Water Dept.
 East Las Vegas: Agua Pura Co.
 Santa Fe: New Mexico Power Co.

NEW YORK

Honorary 1; Active 271; Corporate
 28; Associate 43; Total 343

HONORARY

Troy: Mason

ACTIVE

Albany: Bates, Cox, Davis, Gilcreas,
 Holmquist, Horton, Hough, Suter,
 Wheeler, Willcomb
 Ashokan: Friedman
 Avon: Clark
 Bay Shore: Fenn
 Binghamton: Prentice
 Briarcliff Manor: Manahan
 Brooklyn: Armstrong, Flannery,
 Gaffney, Hale, Horandt, Roux
 Buffalo: Ames, Bassett (Charles K.),
 Bassett (Geo. B.), Dewey, Drake,
 Lund, Nussbaumer, Roberts, Show-
 ell, Jr.
 Canajoharie: Bullock
 Canandaigua: Ellis
 Cohoes: Allan
 Corning: Drake
 Cortland: Coleman, Titchener
 East Rochester: McDonald
 Elmira: Jones
 Elsmere: Tiedeman
 Far Rockaway: Bettes
 Flushing: Laase
 Fredonia: Heubi
 Gloversville: Davies, Orr, Vrooman
 Haverstraw: Chapman
 Herkimer: Wood
 Highbridge: Nelson
 Holland: Muma
 Ithaca: Bishop, Chamot, Seery,
 Walker
 Jackson Heights: Diven
 Jamaica: Keily, Kydd
 Jamestown: Johnson, Swanson
 Johnstown: Knowles
 Kingston: Cashin, Loughran
 LeRoy: Dooley
 Lockport: Hooker
 Long Island City: Ankener, Fitz-
 gerald
 Lynbrook: Durland, Rowley, Stearns

Malone: Van Deusen
Mamaroneck: Duffy
Middletown: Gates
Mineola: Hendrick
Mount Kisco: Mathews
Mount Vernon: Manahan, Stephenson, Theobald, Wolbert
Newark: Wright
Newburgh: Gilerist, Kingsley
New Rochelle: Cranch, Gooding, Wright
New York: Applebaum, Baldwin, Ballou, Berry, Besselievre, Biggs, Jr., Blanchard, Blum, Bogert, Booth, Boyd, Brush, Bull, Case, Chenery, Chevalier, Childs, Cleverdon, Cole, Coulter, Cuddeback, Cunningham, Curry, Jr., Dennett, Donaldson, Dorer, Dowd, Enslow, Everett, Ewry, Freer, Fuller, Carland, Gill, Goodman, Hansen Harding, Jr., Hauck, Helbig, Herring, Hill, Jr., Hoag, Hochlerner, Hodgman, Holdredge, Hollander, Howland, Jackson, Jacobs, Jacocks, Johnson, Jones, Kellogg, Kendall, Kerslake, Kienle, Kiker, Jr., Killam, Kriegsheim, Lang, Ledden, Luce, Maahs, Mallay, Merriman, Meyerherm, Miller, Mower, Jr., Newsom, Niesley, Norcom, Northrop, Nuebling, Palmer, Pardee, Patitz, Patton, Phelps, Pincus, Pirnie, Potter, Potts, Provost, Jr., Quilty, Ramirez, Reed, Riddick, Robbins, Ruff, Ruggles, Sanborn, Saville, Sawyer, Scott, Seabury, Shiflett, Shuldener, Siems, Sinclair, Spear, Stewart, Stuart, Tainter, Trowbridge, Turner, Tuttle, Vermeule, Vertefeuille, Walker, Warde, Weiler, Wertz, Wiggin, Williamson, Wolf, Wood, Woodhouse, Wormser
Niagara Falls: Butler, Dignan, Robbins
Norwich: Ames
Olean: Poarch
Oneida: White
Oneonta: Watkins
Ossining: Miller
Oswego: McCaffrey
Peekskill: Wood
Pleasantville: Hannan, Jr.
Port Jervis: Sheldon
Poughkeepsie: Walker
Queens: Keogh
Queens Village: Gutteridge
Rensselaer: Clafin
Rochester: Edwards, Ellendt, Hayes, Hopkins, Julian, Leahy, Lewis, Little,

Lynch, Matthews, Miller, Morrison, Russell, Shnidman, Skinner, Smith
Rye: Ehler
Scarsdale: Henshaw, Wyckoff
Schenectady: Devendorf, Taylor
Slingerlands: Leach
Spring Valley: Mosier
Syracuse: Daw, Elder, Keating, Mitchell, Thompson
Tarrytown: Helling, Losee
Troy: Caird, Clifton, End, Keis, Knickerbacker, Solomon
Utica: Ackerman, Brayton, Griswold, Hopkins (Edwin W.), Hopkins (Franklyn C.), Wharton
Valhalla: Havill
Valley Stream: Morlan
Voorheesville: Horton
Waterford: Yaxley
Watertown: Field
Wellsville: Rowe
West New Brighton: Decker
White Plains: Conlan
Woodhaven: Bliven
Worcester: Rickard
Yonkers: Carroll, Harmonay

CORPORATE

Auburn: Water Dept.
Buffalo: Division of Water
Corning: Water Works
Elmhurst: Citizens Water Supply Co.
Elmira: Water Board
Endicott: Endicott Water Works Co.
Fishers Island: Fishers Island Farms, Inc.
Glens Falls: Board of Water Commissioners
Illon: Board of Water Commissioners
Johnson City: Water Dept.
Kenwood: Sherrill-Kenwood Water Commission
Lowville: Adirondack Water Works
Maspeth: Urban Water Supply Co.
New Rochelle: New Rochelle Water Co.
New York: American Water Works & Electric Co., Community Water Service Co., Electric Bond & Share Co., Federal Light & Traction Co., Northeastern Water & Electric Service Corp.
Olean: Board of Water Commissioners
Oswego: Dept. of Water
Owego: Water Works
Poughkeepsie: Water Dept.
Rome: Bureau of Water
Syracuse: Bureau of Water
Troy: Bureau of Water

Watertown: Water Works

White Plains: Dept of Public Works

ASSOCIATE

Baldwinsville: Morris Machine Works

Brooklyn: National Meter Co., Jos. G. Pollard Co., Inc.

Buffalo: Bingham & Taylor Corp., Buffalo Meter Co.

Elmira: Kennedy Valve Mfg. Co.

Long Island City: Pardee Engineering Co.

Mamaroneck: Trohn's Supplies, Inc.

New York: Ambursen Construction Co., "American City," American

Cyanamid & Chemical Corp., Central Foundry Co., Copper & Brass

Research Association, The Dorr Co., Inc., East Jersey Pipe Co., Electro

Bleaching Gas Co., "Engineering News-Record," Hooker Electro-

chemical Co., Industrial Chemical Sales Co., Inc., Ipameo Pipe Corp.,

Jenkins Bros., Johns-Manville Sales Corp., Linde Air Products

Co., Inc., Mathieson Alkali Works, Inc., National Water Main Clean-

ing Co., Neptune Meter Co., Parsons, Klapp, Brinckerhoff & Doug-

las, Pitometer Co., "Public Works," R. U. V. Co., Inc., Thomson Meter

Co., Victaulic Co. of America, Walles Dove-Hermiston Corp.,

Warren Foundry & Pipe Corp., "Water Works Engineering,"

Worthington Pump & Machinery Corp.

Prince's Bay: Phoenix Meter Corp.

Rome: Rome Brass & Copper Co.

Troy: W. & L. E. Gurley, Ludlow Valve Mfg. Co., Rensselaer Valve

Co., Ross Valve Mfg. Co., Inc.

Waterford: Eddy Valve Co.

NORTH CAROLINA

Active 67; Corporate 3; Associate 1;
Total 71

ACTIVE

Albemarle: Moore

Asheboro: Yow

Asheville: Burchard

Bethel: Lawson

Blue Ridge: Georgia

Chapel Hill: Baity, Bennett, Hollett, Thompson

Charlotte: Davis, Doane, Greenlee, Heyward, Vest

Concord: Fisher

Durham: Hall, Michie, Piatt, Worth

Elizabeth City: Luther

Elon College: Ireland

Enka: Frisk

Fremont: Benton

Gastonia: Rhyne

Greensboro: Lybrook, Medford, Scott, Smedberg, True

Greenville: Swartz

Henderson: Bridgers

Hendersonville: Lampley

High Point: Moss

Kannapolis: Bryant

Lexington: Bullard

Moorestville: Davidson

Morehead City: Magee

Mount Airy: Merritt

New Bern: Godfroy

Oxford: Evans

Raleigh: Bain, Beam, Booker, Jessup, Kellogg, Melvin, McLeod, Trice, Whitener, Whitman

Reidsville: Bugher

Roanoke Rapids: Harrell

Rocky Mount: Lyon

Salisbury: English

Sanford: Butler

Southern Pines: Mills, Van Camp

Statesville: Abell, Cochran, Grier

Tarboro: Martin

Washington: Meredith

West Asheville: Floyd

Wilmington: Lassiter

Wilson: Johnson

Winston-Salem: Ebert, Shaner

CORPORATE

Durham: Water Dept.

Hickory: City of Hickory

Warrenton: Warrenton Water Co.

ASSOCIATE

Charlotte: Grinnell Co., Inc.

NORTH DAKOTA

Active 2; Corporate 1; Total 3

ACTIVE

Bismarck: Yegen

Fargo: Tarbell

CORPORATE

Bismarck: Regulatory Dept.

OHIO

Active 59; Corporate 1; Associate 7;
Total 67

ACTIVE

Akron: Elting, LaDue

Ashtabula: Faulkner

Bucyrus: Lower

California: Bahlman

Cincinnati: Eberling, Evans, Hibbs,
Miller, Munyan

Cleveland: Antweiler, Braidech,
Brueggeman, Carey, Ellms, Gas-
coigne, Havens, Lawrence, Levy,
Marshall, Tolles

Columbus: Albert, Bradbury, Brown
Burgess, Foulk, Hoover, Knox,
Kuhns, Lathrop, Prior, Urbain,
Waring

Dayton: Morehouse

Dennison: Romig

East Liverpool: Larkins, Robinson

Fremont: Schneider

Hamilton County Court House:
Raffety

Kent: Gettrust

Lima: Stimmel

Lorain: Brown

Marion: Whysall

Massillon: Ulrich

Orrville: Webster

Painesville: Cook

Sandusky: Schoepfle

Struthers: Cody, Evans

Tiffin: Wetter

Toledo: Champe, Furman, Jones

Warren: Inman

Youngstown: Dittoe, Dixon, Russell,

Van Arnum,

Zanesville: Winslow, Jr.

CORPORATE

Chillicothe: Chillicothe Water Co.

ASSOCIATE

Barberton: Babcock & Wilcox Co.

Cincinnati: Bourbon Copper & Brass
Works Co.

Cleveland: Farnan Brass Works Co.,
Fred W. Hanks Co.

Massillon: Peerless Pump Co.

Middletown: American Rolling Mill
Co.

Youngstown: Republic Steel Co.

OKLAHOMA

Active 5; Total 5

ACTIVE

Bartlesville: Perkins

Oklahoma City: Bretz, Cunningham

Stillwater: Smith

Tulsa: Holway

OREGON

Active 28; Corporate 2; Total 30

ACTIVE

Corvallis: Merryfield, Strange

Dallas: Soehren

Eugene: McArthur

Hillsboro: Gates

Maplewood: Hoffman

Portland: Anderson, Benedict, Cun-
ningham, Disher, Fague, Green,
Hamilton, Judson, Kaiser, Koon,
Marshall, Morrow, Stober, Thomp-
son, Wagner, Willard

Salem: Delaney, Johnson

Sandy: Maupin

Silverton: McCleary

Tillamook: Berkey

West Linn: Blanchard

CORPORATE

Medford: Water Commission

McMinnville: Water and Light Dept.

PENNSYLVANIA

Active 128; Corporate 17; Associate
22; Total 167

ACTIVE

Allentown: Schnabel

Altoona: Ale, Swab

Ambler: Hibschman

Beaver Falls: Burnie

Bellevue: Barton

Bradford: Gregg

Bristol: Roberts, Jr.

Bryn Mawr: Davis, Jenkins,
McCurdy

Chambersburg: Mowrey

Chester: Dodd, Muser

Clarks Summit: Owens

Clearfield: Nevling

Downingtown: Wagner

DuBois: Warren

Easton: Odenwelder, Jr.

Erie: Dunwoody, Lechner

Greensburg: Flentje, Kelso, Spen-
cer, Witt

Hamburg: Chubb

Harrisburg: Beckwith, Berry, Brun-
ner, Carpenter, Daniels, Glace,

Gorman, Jr., Moses

Indiana: Pharaoh

Johnstown: Hagins, Kunkle

Lancaster: Abraham, Goodell,
Malone

Langhorne: Stompler

Lemoyne: Eisert

McKeesport: Trax

Meadville: Ellsworth, Young

Natrona: Knight

New Kensington: Griffiths

North East: Leet

Northampton: DeGroot

Philadelphia: Bean, Becker, Betz,

Birkinbine, Boardman, Corin,

Daugherty, Freeburn, Friel, Greer,

Gushee, Haydock, Hayes, Hedgepeth, Hoffer, Kappe, Lawrence, McKay, Jr., Nichols, Oppermann, Read, Reinicker, Ridenour, Schaut, Van Loan, Walker, Wood
Phillipsburg: Rumberger
Pittsburgh: Bankson, Baton, Campbell, Chester, Craig, Davis, Donnan, Harshbarger, Hendrickson, Jacobs, Keefer, Kennon, Laboon, Leopold, Lynn, Mansfield, Mellon, Nelson, Rockwell, Scharff, Speller, Weidlein
Pottsville: Beisel, Clayton
Punxsutawney: Startzell
Reading: Felix, Heine, O'Reilly, Reeder, Strockbine
Sayre: West
Scottdale: Buck
Scranton: Kneen, Lyle, Nebelung, Taylor
Shamokin: Haupt, McWilliams
Shillington: Nissly
State College: Turner, Walker
Swarthmore: Potter
Washington: Murdoch, Jr.
Waynesboro: Shank
Wilkes-Barre: Matter
Wilkinsburg: Adams, Fox, Howley
Williamsport: Barrick, Keliher
York: Kable

CORPORATE

Allentown: Water Dept.
Bethlehem: City of Bethlehem
Bryn Mawr: Philadelphia Suburban Water Co.
Emporium: Emporium Water Co.
Erie: Commissioners of Water Works
Greensburg: Westmoreland Water Co.
Lewistown: Lewistown-Reedsville Water Co.
Milton: White Deer Mountain Water Co.
Oil City: Bureau of Water
Philadelphia: General Management Corp.
Reading: Bureau of Water
Scranton: Scranton-Spring Brook Water Service Co.
Sharon: Shenango Valley Water Co.
Shickshinny: Shickshinny Water Co.
Verona: Suburban Water Co.
Washington: Citizens Water Co.
Williamsport: Williamsport Water Co.

ASSOCIATE

Bethlehem: McClintic-Marshall Corp.

Berwick: Multiplex Mfg. Co.
Bradford: S. R. Dresser Mfg. Co.
Emaus: Donaldson Iron Co.
Erie: Hays Mfg. Co.
Mertztown: Atlas Mineral Products Co.
Philadelphia: American Water Softener Co., Baldwin-Southwark Corp., M. L. Bayard, The Leadite Co., Pennsylvania Salt Mfg. Co., Reading Iron Co., Roberts Filter Mfg. Co., Simplex Valve & Meter Co., United States Pipe & Foundry Co., R. D. Wood Co.
Pittsburgh: A. M. Byers Co., National Tube Co., Pittsburgh-Des Moines Steel Co., Pittsburgh Equitable Meter Co.
Williamsport: Darling Valve & Mfg. Co.
York: S. Morgan Smith Co.

RHODE ISLAND

Active 4; Corporate 1; Associate 1;
 Total 6

ACTIVE

Cranston: Bean
Providence: Craig, Reynolds, Richardson

CORPORATE

Providence: Water Maintenance Dept.

ASSOCIATE

Providence: Builders Iron Foundry

SOUTH CAROLINA

Active 18; Corporate 1; Total 19

ACTIVE

Aiken: Sudlow
Camden: Tobin
Charleston: Gibson, McDowell, Jr., Parker
Chesnee: Marquis
Chester: McLure
Columbia: White
Greenville: Blackwelder, Perry
Greenwood: Chapman
Laurens: Lovejoy
Newberry: Schumpert
Orangeburg: Pearson
Spartanburg: Simms
Summerville: Moorer
Walterboro: Dunham
Winnsboro: Meng

CORPORATE

Charleston: Commissioners of Public Works

SOUTH DAKOTA

Active 5; Corporate 1; Total 6

ACTIVE

Aberdeen: Mathews
 Mitchell: Mather
 Pierre: Towne
 Sioux Falls: Connor
 Vermillion: Hunter

CORPORATE

Sioux Falls: Water Works

TENNESSEEActive 16; Corporate 2; Associate 2;
Total 20**ACTIVE**

Chattanooga: Lofton, Porzelius,
 Shawver
 Cookeville: Collier
 Dyersburg: Blakeman
 Fountain City: Murphy
 Greeneville: McAmis
 Knoxville: Pierce, Quinn, Strom-
 quist, Switzer
 Livingston: Smith
 Nashville: Fry, Harrub, Helman,
 Lawrence, Jr.

CORPORATE

Knoxville: Water Dept.
 Memphis: Board of Water Com-
 missioners

ASSOCIATE

Chattanooga: Columbian Iron Works
 Memphis: Layne & Bowler Co.

TEXAS

Active 15; Corporate 3; Total 18

ACTIVE

Austin: Ehlers, Green, Munro
 Beaumont: Bernhagen
 Dallas: Connell, Morey, Jr., Rosen-
 thal
 Fort Worth: Hawley, Mahlie, Porter,
 Quigley, Robinson
 Houston: Elrod
 Waco: Gooch
 Wichita Falls: Ward

CORPORATE

Dallas: Water Works
 Houston: Water Division
 Waco: Water Works

UTAHActive 2; Corporate 1; Associate 1;
Total 4**ACTIVE**

Provo City: Newell
 Salt Lake City: Painter

CORPORATE

Salt Lake City: Water Dept.

ASSOCIATEProvo: Pacific States Cast Iron Pipe
Co.**VERMONT**

Active 1; Total 1

ACTIVE

Burlington: Moat

VIRGINIA

Active 27; Associate 3; Total 30

ACTIVE

Alexandria: Lamond
 Ashland: Melton
 Blacksburg: Sette
 Clarendon: Engle
 Danville: Brantly, Johnson
 Falls Church: Anderson
 Fieldale: Whitten
 Hampton: Nichols
 Harrisonburg: Noll
 Lawrenceville: Hayes
 Lynchburg: Capron, Wagner
 Newport News: Dugger, Harman
 Richmond: Baldwin, Bardwell,
 Bingham, Bird, Messer, Smith,
 Snidow
 Roanoke: Moore, Taylor
 Rocky Mount: Ramsey
 Shawsville: Snead
 Staunton: Rice

ASSOCIATE

Lynchburg: Glamorgan Pipe &
 Foundry Co., Lynchburg Foundry
 Co.
 Norfolk: Layne-Atlantic Co.

WASHINGTONActive 35; Corporate 4; Associate 2;
Total 41**ACTIVE**

Aberdeen: Watkins
 Bellingham: Kinzer, Reilly
 Bremerton: Casad
 Dayton: Dorr
 Hoquiam: Austin, Heermans
 Longview: Labsap
 Okanogan: Van Liew
 Olympia: Williams
 Pomeroy: Bunch

Port Angeles: White
 Pullman: Snyder
 Renton: Thorne
 Ritzville: Colwell
 Seattle: Batcheller, Botten, Hallgren, Jacobs, Lewis, Miller, Mitchell, Murray, Osborne, Purcell, Schunke, Shibley, Tyler
 Spokane: Hedman
 Tacoma: Hooker, Jr., Kunigk, Shaneman
 Walla Walla: McLean
 Yakima: Gilman

CORPORATE

Seattle: Water Dept.
 Spokane: Water Division, Washington Water Power Co.
 Wenatchee: Water Dept.

ASSOCIATE

Seattle: Federal Pipe & Tank Co., Olympic Foundry Co.

WEST VIRGINIA

Active 27; Corporate 1; Total 28

ACTIVE

Benwood: Davis
 Bluefield: Rhoads
 Charleston: Dark, Larmon, MacDonald, McCaskey, McLaughlin, Musser, Van den Berg, Jr.
 Chester: Young
 Clarksburg: Boynton, Highland
 East Rainelle: Staub
 Elkins: Roetman
 Huntington: Mace, McKenna
 Keyser: Blundon, Snyder
 Madison: Holy
 Morgantown: Carpenter
 Moundsville: Hetzer
 Parkersburg: Huber
 Weston: Blair, Jr., Martin
 Wheeling: Shull, Todd, Wiesner, Jr.

CORPORATE

Charleston: West Virginia Water Service Co.

WISCONSIN

Honorary 1; Active 53; Corporate 5; Associate 2; Total 61

HONORARY

Madison: Mead

ACTIVE

Antigo: Jackson
 Appleton: Dimick, Gallaher

Ashland: Haney
 Eau Claire: Brown
 Fort Atkinson: Leonard
 Hurley: Williams
 Janesville: Griffey
 Kaukauna: Weekwerth
 Lake Geneva: O'Neill
 Madison: Dawson, Domogalla, Gauer, Kirchoffer, Muegge, Nichols, Shoemaker, Smith, Thiessen, Ward, Warrick, White
 Manitowoc: Schroeder
 Marshfield: Marvin
 Menasha: Kuester

Milwaukee: Bohmann, Brown, Cahill, Cunliffe, Gruetzmacher, Murphy, Nordberg, Schwada, Thomas, Wright

Neopit: Bibelhausen
 Oshkosh: Geffers, Hintz, Jr., Mitchell, Schneider

Portage: Allmendinger
 Racine: Peirce, Quimby
 Sheboygan: Donohue, Zufelt
 Stevens Point: Van Hecke
 Sturgeon Bay: Johnson
 Superior: Corine, Lounsbury
 Watertown: Reichardt
 Waukesha: Kuranz
 Wauwatosa: Hebbing
 Wisconsin Rapids: Gross

CORPORATE

Delavan: Water Commission
 Fond du Lac: Water Dept.
 Green Bay: Water Dept.
 Oconomowoc: Water Dept.
 Sheboygan: Board of Water Commissioners

ASSOCIATE

Milwaukee: Allis-Chalmers Mfg. Co., Badger Meter Mfg. Co.

WYOMING

Active 2; Total 2

ACTIVE

Cheyenne: Baldwin
 Cody: Bell

CANADA

Active 148; Corporate 36; Associate 1; Total 185

ACTIVE

Amherstburg: Webster
 Beamsville: Claus
 Birch Cliff: Harrison
 Bowmanville: Chase
 Brantford: Adams

Brockville: Farquharson
 Buckingham: Lonergan
 Calgary: Robinson
 Carleton: Rogers
 Charlottetown: McMillan
 Chesley: Grabb
 Cobourg: Skidmore
 Cochrane: Graff
 Collingwood: Stapleton
 Cornwall: Campbell
 Crystal Beach: Hallgren
 Dundas: Wright
 Elmira: Bowman
 Galt: Cuthiell
 Hamilton: Buchanan, Darling,
 Matheson, McFaul, Veale
 Hespeler: Meyer
 Hull: McCrone
 Ingersoll: Hall
 Islington: Walker
 Joliette: Lippe
 Kingston: Folger, Malcolm
 Kitchener: Pequegnat
 Lachine: Deslauriers
 Lindsay: Hammond
 Listowel: Hanna
 London: Buchanan, Hodkinson
 Meaford: Brown
 Montreal: Beaubien, Cyr, Dorrance,
 Fairbairn, Field, French, Gaboury,
 Gohier, Hill, Hutchison, Jette,
 Lafreniere, Lea, Leslie, Meadows,
 McCrady, Plamondon, Roquet,
 Seofield, Van Patter
 Mount Forest: Livingstone
 Napanee: Dafee
 Niagara Falls: Acres, Ker, Warder
 Noranda: Rose
 North Battleford: Salmon
 Oshawa: Walker
 Ottawa: Barry, Ferguson, Heeney,
 MacDonald, Stockwell, Jr., War-
 ner, Wilson
 Owen Sound: Pratt
 Palmerston: Oke
 Penetanguishene: Parker
 Perth: Smith
 Peterborough: Dobbin, Hunt
 Picton: Tait
 Port Arthur: Antonisen
 Ridgetown: Campbell
 Shawinigan Falls: Vermette
 St. Stephen: Laffin
 St. Thomas: Miller
 Sarnia: Hall
 Southend: Pringle
 Stratford: Manson
 Sudbury: Martindale
 Temiskaming: Grimmer
 Toronto: Allan, Angus, Austin,

Berry, Gaby, Hannan, Harris,
 Heath, Hitchman, Howard, Hud-
 son, Hutchinson, Jack, Johnston,
 MacDonald, McGarigle, McJannet,
 McManamna, Proctor, Redfern,
 Routledge, Russell, Salmond, San-
 derson, Stewart, Storrie, Thomp-
 son, Van Benschoten, Walker,
 White, Williamson, Wynne-Roberts
 Valleyfield: Belanger
 Vancouver: Belyea, Brakenridge,
 Cleveland, Rome
 Verdun: DesBaillets
 Victoria: Irwin
 Ville La Salle: LeSage
 Walkerville: Brown
 Wallaceburg: Caughey
 Waterloo: Grosz
 Watford: Williamson
 Weston: Peirson
 Wheatley: Chute
 Windsor: Armstrong, Hanna, Keith,
 Kellner, Storey, Strickland
 Winnipeg: Brickenden, Hurst, Lind-
 sten, McKinnon, Scott
 Woodstock: Archibald

CORPORATE

Belleville: Corporation City of Belle-
 ville
 Brampton: Water Commission
 Brantford: Water Commissioners
 Chatham: Board of Water Commis-
 sioners
 Gananoque: Water Works Commis-
 sion
 Grimsby: Water Commission
 Guelph: H. S. Nicklin
 Kirkland Lake: Township of Teck
 Kitchener: Water Commission
 London: Public Utilities Commission
 Merritton: Water Works Dept.
 Midland: Public Utilities Commission
 New Toronto: Public Utilities Com-
 mission
 Niagara Falls: City of Niagara Falls
 Oakville: Water & Light Commission
 Orillia: Water, Light & Power
 Commission
 Oshawa: Public Utilities Commission
 Ottawa: Water Works Dept.
 Peterborough: Utilities Commission
 Port Hope: Water Works Commission
 Regina: Water Works Dept.
 St. Marys: Public Utilities Commis-
 sion
 St. Thomas: A. F. McLachlin
 Simcoe: Public Utilities Commission
 Strathroy: Public Utilities Commis-
 sion

Tilbury: Public Utilities Commission
 Tillsonburg: Public Utilities Commission
 Timmins: Corporation Town of Timmins
 Toronto: Ontario Dept. of Health, Township of York
 Walkerville: Walkerville-East
 Windsor Water Commission

Wallaceburg: Town of Wallaceburg
 Welland: Board of Water Commission
 Willowdale: Corporation of Township of North York
 Windsor: Water Commissioners
 Whitby: Public Utility Commission

ASSOCIATE

Toronto: "Canadian Engineer"

FOREIGN (Except Canada) AND U. S. TERRITORIES

Active 87; Corporate 6; Total 93

ACTIVE

ARGENTINE REPUBLIC

Buenos Aires: Lasso, Paitovi, Putnam
 Parana: Laurencena
 Rosario de Santa Fe: Buchanan

AUSTRALIA

Ballarat: Farrer
 Melbourne: Ritchie, Sutherland
 Midland Junction: Limb
 Sydney: Nicol

BRAZIL

Geraes: Continentino
 Rio de Janeiro: Aceioly, DeBrito, Sampaio

CANAL ZONE

Ancon: Bunker, Hatch
 Cristobal: Dunn

CHINA

Shanghai: Pearson
 Tientsin: Clark

COLOMBIA

Barranquilla: Armstrong, Urueta

COSTA RICA

Cartago: Picado
 San Jose: Bertolini, Bolanos

CUBA

Havana: Cosculluela, Martinez, Zanetti

DENMARK

Copenhagen: Jarvis

ENGLAND

Bournemouth: Moon
 Bradford: Bowen, Newlands, Renton, Whiteley
 Buxton: Race
 Grange-over-Sands: Tomlinson
 Harrow: Waddington
 Ilkley: Mitchell
 London: Cameron, Cook, Green, Howland, Paterson, Stevens
 Maldon: Strachan
 Northwich: Jones
 Staines: Palmer
 Sunderland: Carey
 Wolverhampton: Page

FRANCE

Montrouge: Pain
 Nancy: Imbeaux, Paul
 Paris: Chidaine, Michau
 Pont-a-Mousson: Mouchette

GERMANY

Berlin: Kniesel, Ornstein
 Dresden: Vollmar
 Stuttgart: Link

GREECE

Athens: Farrell, Gausmann, Georgalas

HAWAII

Honolulu: Tay

HOLLAND

Utrecht: Massink

HUNGARY

Budapest: Vojesik

INDIA

Calcutta: Banerjee
Gwalior: Prokofieff
Patna: Temple
Trivandrum: Pillay

ITALY

Milano: Rocca

JAMAICA, B. W. I.

Jamaica: Kirkpatrick

JAPAN

Hyogo-Ken: Takeuchi
Tokyo-Shiyakusho: Iwasaki
Yokohama: Horie

MEXICO

Mexico: Gama, Holste, Robles, Vil-
la-Acosta
Torreon: Ruiz

PORTUGAL

Cascaes: Garcia

RUSSIA

Leningrad: Timonoff

SCOTLAND

Kilmarnock: Ball

STRAITS SETTLEMENTS

Singapore: Cooke, Murnane

SWEDEN

Boras: Sonden
Stockholm: Bergstrom, Von Greyerz

URUGUAY

Montevideo: Altoberro, Moir

CORPORATE

ARGENTINE REPUBLIC

Buenos Aires: Obras Sanitarias de
la Nacion
Parana: Obras Sanitarias of Entre
Rios

HAWAII

Honolulu: Board of Water Supply
Oahu: Wahiawa Water Co., Ltd.

HOLLAND

Utrecht: Utrechtsche Waterleiding-
Maatschappij

SWEDEN

Malmo: Malmo Byggnadskontor

SUMMARY BY STATES

	Active	Corporate	Associate	Honorary	Total
Alabama.....	5	1	6		12
Arizona.....	4				4
Arkansas.....	5	2			7
California.....	240	25	19	1	285
Colorado.....	24	7	1		32
Connecticut.....	19	3	2		24
Delaware.....	8				8
Dist. of Columbia.....	12	2			14
Florida.....	27	3			30
Georgia.....	50	2	3		55
Idaho.....	11	1			12
Illinois.....	141	7	15	2	165
Indiana.....	50	4	4		58
Iowa.....	38	1	1	1	41
Kansas.....	10	2			12
Kentucky.....	23	6	1		30
Louisiana.....	11	1		1	13
Maine.....	8	1			9
Maryland.....	25				25
Massachusetts.....	59		6	4	69
Michigan.....	40	4	1		45
Minnesota.....	35	4	1		40
Mississippi.....	6				6
Missouri.....	45	1	2		48
Montana.....	26	3			29
Nebraska.....	7	2	2		11
Nevada.....	1	1			2
New Hampshire.....	4	1			5
New Jersey.....	86	7	5		98
New Mexico.....	5	3			8
New York.....	271	28	43	1	343
North Carolina.....	67	3	1		71
North Dakota.....	2	1			3
Ohio.....	59	1	7		67
Oklahoma.....	5				5
Oregon.....	28	2			30
Pennsylvania.....	128	17	22		167
Rhode Island.....	4	1	1		6
South Carolina.....	18	1			19
South Dakota.....	5	1			6
Tennessee.....	16	2	2		20
Texas.....	15	3			18
Utah.....	2	1	1		4
Vermont.....	1				1
Virginia.....	27		3		30
Washington.....	35	4	2		41
West Virginia.....	27	1			28
Wisconsin.....	53	5	2	1	61
Wyoming.....	2				2
Canada.....	148	36	1		185
Foreign (except Canada) and U. S. Territories.....	88	6			94
October 1, 1934.....	2026	207	154	11	2398
October 1, 1933.....	2038	204	155	15	2412
Gain or Loss in year.....	-12	+3	-1	-4	-14

ADVERTISEMENT SECTION

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CLASSIFIED INDEX TO ADVERTISEMENTS

- Access Shafting:**
Alco Products, Inc.
- Activated Carbon:**
Graver Tank & Mfg. Corp.
Industrial Chemical Sales Co.
- Agitators:**
Alco Products, Inc.
Graver Tank & Mfg. Corp.
- Air Compressors:**
Allis-Chalmers Mfg. Co.
DeLaval Steam Turbine Co.
Worthington Pump & Machinery Corp.
- Air Lift Pumping Systems:**
Worthington Pump & Machinery Corp.
- Airlocks:**
Alco Products, Inc.
- Alum:**
General Chemical Co.
Pennsylvania Salt Mfg. Co.
- Ammonia Receivers:**
Alco Products, Inc.
- Aqua Tester:**
Hellige, Inc.
- Base-Exchange Silicate (Zeolite):**
Permutit Co.
Zeolite Chemical Co.
- Boiler Blowoff Apparatus:**
Graver Tank & Mfg. Corp.
Permutit Co.
- Brass Goods:**
(See also, Pipe, Brass)
Chapman Valve Mfg. Co.
Kennedy Valve Mfg. Co.
Kitson Co.
Mueller Co.
A. P. Smith Mfg. Co.
Union Water Meter Co.
- Brass Well Screens:**
A. D. Cook, Inc.
Edward E. Johnson, Inc.
- Calking Tools:**
Mueller Co.
- Cast Iron Pipe:**
(See Pipe)
- Cement Lined Pipe:**
(See Pipe)
- Cement Lining Presses:**
Union Water Meter Co.
- Centrifuges:**
Bausch & Lomb Optical Co.
- Chemical Feed Apparatus:**
American Water Softener Co.
Builders Iron Foundry
Graver Tank & Mfg. Corp.
New York Continental Jewell Filtration Co.
Permutit Co.
Ross Valve Mfg. Co.
- Simplex Valve & Meter Co.**
Wallace & Tiernan Co., Inc.
- Chemicals for Laboratory Use:**
Difco Laboratories
La Motte Chemical Products Co.
- Chemicals for Water Purification:**
General Chemical Co.
Industrial Chemical Sales Co., Inc.
Pennsylvania Salt Mfg. Co.
- Chemists and Engineers:**
(See Directory of Experts, page 15)
- Chlorinators:**
Wallace & Tiernan Co., Inc.
- Chlorine Comparator:**
Hellige, Inc.
La Motte Chemical Products Co.
- Chlorine, Liquid:**
Pennsylvania Salt Mfg. Co.
Wallace & Tiernan Co., Inc.
- Clamps, Bell Joint:**
S. R. Dresser Mfg. Co.
- Clarifiers:**
Graver Tank & Mfg. Corp.
Permutit Co.
- Clay Spaders:**
Worthington Pump & Machinery Corp.
- Cleaning Water Mains:**
National Water Main Cleaning Co.
- Cocks, Curb and Corporation:**
Chapman Valve Mfg. Co.
Kitson Co.
Mueller Co.
A. P. Smith Mfg. Co.
Union Water Meter Co.
- Color Standard for Turbidity, Nitrates, Total Iron, etc.:**
Hellige, Inc.
La Motte Chemical Products Co.
- Colorimetric Analysis Equipment:**
Bausch & Lomb Optical Co.
Hellige, Inc.
La Motte Chemical Products Co.
- Concrete Forms:**
Alco Products, Inc.
- Condensers:**
Allis-Chalmers Mfg. Co.
United States Pipe & Foundry Co.
Worthington Pump & Machinery Corp.
- Contracting Engineers:**
Ambursen Construction Co.
- Contractors Water Supply:**
A. D. Cook, Inc.
- Contractors, Well Drilling:**
A. D. Cook, Inc.
- Copper Service Tubing**
Copper & Brass Research Assn.

- Couplings, Flexible:**
DeLaval Steam Turbine Co.
S. R. Dresser Mfg. Co.
- Curb Boxes:**
Chapman Valve Mfg. Co.
Mueller Co.
- Dams:**
Ambursen Construction Co.
- Dewatering Pumps:**
Worthington Pump & Machinery Corp.
- Diaphragms, Pump:**
Edson Corp.
- Diesel Engines:**
Worthington Pump & Machinery Corp.
- Drills, Rocks:**
Worthington Pump & Machinery Corp.
- Electrically Operated Gate Valves:**
Chapman Valve Mfg. Co.
Kennedy Valve Mfg. Co.
- Engineers and Chemists:**
(See Directory of Experts, page 15)
- Engines:**
(See Pumps and Pumping Engines)
- Evergreen Trees:**
Brown Co.
- Feed Water Filters:**
American Water Softener Co.
Graver Tank & Mfg. Corp.
Permutit Co.
Ross Valve Mfg. Co.
- Feed Water Heaters:**
Worthington Pump & Machinery Corp.
- Feed Water Testing Outfits:**
Hellige, Inc.
La Motte Chemical Products Co.
- Feed Water Treatment:**
American Water Softener Co.
Graver Tank & Mfg. Corp.
Permutit Co.
- Filter Rate Controllers and Gages:**
(See Rate Controllers)
- Filters and Water Softening Plants:**
American Water Softener Co.
Fuller & Everett
Graver Tank & Mfg. Corp.
New York Continental Jewell Filtration Co.
Permutit Co.
Zeolite Chemical Co.
- Filtration Plant Equipment:**
American Water Softener Co.
Builders Iron Foundry
Difco Laboratories
Graver Tank & Mfg. Corp.
New York Continental Jewell Filtration Co.
Permutit Co.
Simplex Valve & Meter Co.
- Filtration Sand:**
Dawes Silica Mining Co.
Ottawa Silica Co.
Permutit Co.
- Fittings, Copper Pipe:**
Chapman Valve Mfg. Co.
Kitson Co.
Mueller Co.
- Fittings, Tees, Ells, etc.:**
Builders Iron Foundry
S. R. Dresser Mfg. Co.
Kennedy Valve Mfg. Co.
Kitson Co.
- Flexible Joints:**
S. R. Dresser Mfg. Co.
United States Pipe & Foundry Co.
R. D. Wood & Co.
- Flumes, Steel:**
Alco Products, Inc.
Graver Tank & Mfg. Corp.
- Furnaces:**
Mueller Co.
A. P. Smith Mfg. Co.
- Gages, Surface, Reservoir and Special Water Works:**
American Water Softener Co.
Builders Iron Foundry
New York Continental Jewell Filtration Co.
Simplex Valve & Meter Co.
- Gas Engines:**
Worthington Pump & Machinery Corp.
- Gate Valves:**
(See Valves, Gate)
- Gates, Shear and Sluice:**
Chapman Valve Mfg. Co.
- Gears, Speed Reducing:**
DeLaval Steam Turbine Co.
- Greensand (Zeolite):**
Permutit Co.
Zeolite Chemical Co.
- Hose, Suction and Discharge:**
Edson Corp.
- Hydrants, Fire:**
Chapman Valve Mfg. Co.
A. D. Cook, Inc.
Kennedy Valve Mfg. Co.
Rensselaer Valve Co.
Ross Valve Mfg. Co.
A. P. Smith Mfg. Co.
R. D. Wood & Co.
- Hydrants, Sprinkling and Flushing:**
Kennedy Valve Mfg. Co.
Mueller Co.
Rensselaer Valve Co.
A. P. Smith Co.
R. D. Wood & Co.
- Hydraulically Operated Gate Valves:**
Chapman Valve Mfg. Co.
Kennedy Valve Mfg. Co.

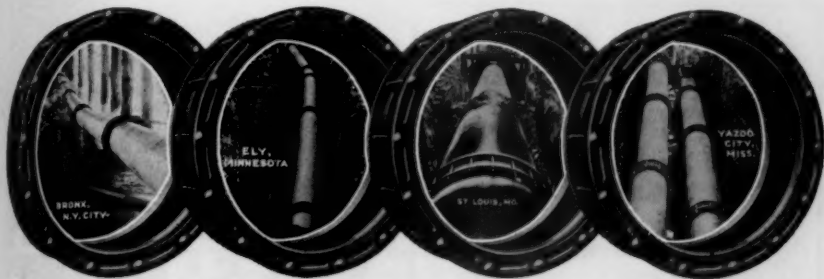
- Hydrogen Ion Equipment:**
 Bausch & Lomb Optical Co.
 Hellige, Inc.
 La Motte Chemical Products Co.
Indicators, Combustion, CO₂, NH₃, SO₂, etc.:
 Permutit Co.
Inserting Machines:
 A. P. Smith Mfg. Co.
Iron Removal Plants:
 American Water Softener Co.
 Graver Tank & Mfg. Corp.
 New York Continental Jewell Filtration Co.
 Permutit Co.
Jointing Materials:
 Atlas Mineral Products Co.
 Hydraulic Development Corp.
 Leadite Co., Inc.
 Mueller Co.
Laboratory Apparatus:
 Difco Laboratories
Lime Slakers and Feeders:
 Graver Tank & Mfg. Corp.
Liquid Chlorine:
 (See Chlorine, liquid)
Machines, Drilling:
 Mueller Co.
Machines, Lead Flanging:
 Mueller Co.
Meters:
 Buffalo Meter Co.
 Builders Iron Foundry
 Graver Tank & Mfg. Corp.
 Hersey Mfg. Co.
 National Meter Co.
 Neptune Meter Co.
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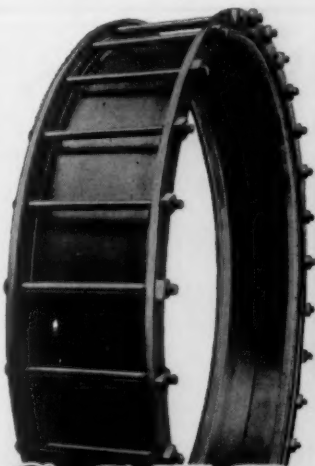
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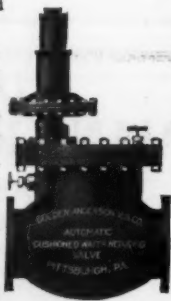
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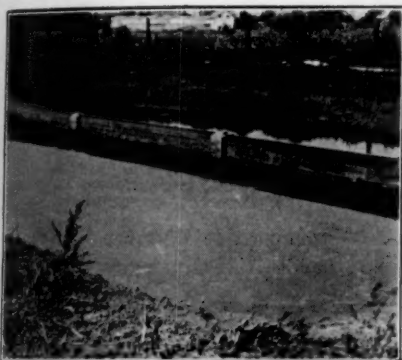
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In this one-room cottage at Saranac Lake, N. Y., the modern treatment of tuberculosis began » » Young Dr. Edward Livingston Trudeau, expecting to die there of the disease, discovered that the more he rested the better he felt » » He recovered, and convinced that rest was the vital factor in the cure, he built the tiny sanatorium, now called "Little Red", in 1885 » » Koch's discovery of the tubercle bacillus, Trudeau's regimen of cure, and Holboell's idea of the Christmas Seal made possible the organized fight against tuberculosis, which still kills more persons between 15 and 45 than any other disease » » Use Christmas Seals on your holiday letters and packages and help conquer it » » » » » » » » » »



**The National, State and Local Tuberculosis Associations  
of the United States**

# BUY CHRISTMAS SEALS

# Warren Foundry & Pipe Corp.

ALSO

Warren Pipe Co. of Mass., Inc.

SALES OFFICES

11 BROADWAY, NEW YORK  
75 FEDERAL ST., BOSTON, MASS.

Manufacturers of

## CAST IRON PIPE

Sizes 2" to 84"

*Flanged Pipe*

*Flexible Joint Pipe*

*Bell and Spigot Pipe*

*Special Castings*

*Short Body B. & S. Specials*

*Warren (W) Spun Centrifugally Cast Iron Pipe*

WORKS: PHILLIPSBURG, N. J. and EVERETT, MASS.

Large Stock Enables Us to Make Prompt Shipments

## IN SUDDEN EMERGENCY MORE CERTAIN THAN MANUAL STARTING

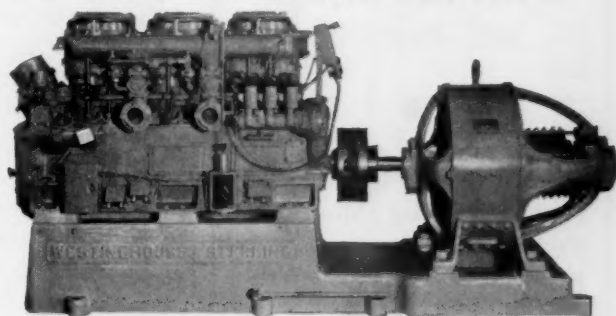
is the automatic starting equipment which can be furnished with

**Sterling  
High Duty**



**Internal  
Combustion  
Engines**

12 to 565 B.H.P.  
Gas or Gasoline



For emergency lighting at the State Farm Show Bldg., at Harrisburg, Pa., a Sterling Dolphin C-6 cyl. 180 H.P. engine drives a Westinghouse generator direct connected at 1250 R.P.M. Gas fuel. Automatic starting.

No attendant is required. Thousands of starts have been recorded in service, with uncanny reliability.

### STERLING ENGINE COMPANY

1270 Niagara St.  
Buffalo, N. Y.

Dept. C-3

900 Chrysler Building  
New York, N. Y.

## EDSON DIAPHRAGM PUMPS

Hand Operated—size 2", 2½", 3", 4"

Power Operated—size 3" and 4"

Open Discharge or Force Pump  
Skid, Truck or Trailer Mounted

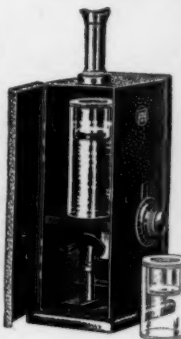
Complete Pump Outfits, Genuine  
Edson Pumps, Suction Hose,  
Brass Couplings, Brz, Clamps,  
Red Seal Diaphragms,  
Brass Strainer or Foot Valve,  
Hose Spanners, Adapters, Etc.  
Standard Hydrant Guard

### THE EDSON CORPORATION

Main Office and Works: 49 D St.,  
South Boston, Mass.

New York: 142 Ashland Pl., Brooklyn

## NEW HELLIGE TURBIDIMETER



Eliminates the preparation and use of standard suspensions. Utmost convenience. Highest accuracy. If connected to the water line, the apparatus permits a continuous check of the turbidity without the necessity of refilling tubes with

individual samples.

Reads all turbidities down to zero-turbid water.

Bulletin No. 8000 contains detailed information.

# HELLIGE

INCORPORATED

179 EAST 87th STREET, NEW YORK, N.Y.

## WHITE FILTER SAND

98% Pure Silica

Washed, Screened and Dried.  
No Freight on Moisture—  
Prompt shipment in Bags or  
paper lined Box Cars—Write  
or wire us for information and  
prices.

DAWES SILICA MINING  
COMPANY

*Silica Mines*

THOMASVILLE, GEORGIA

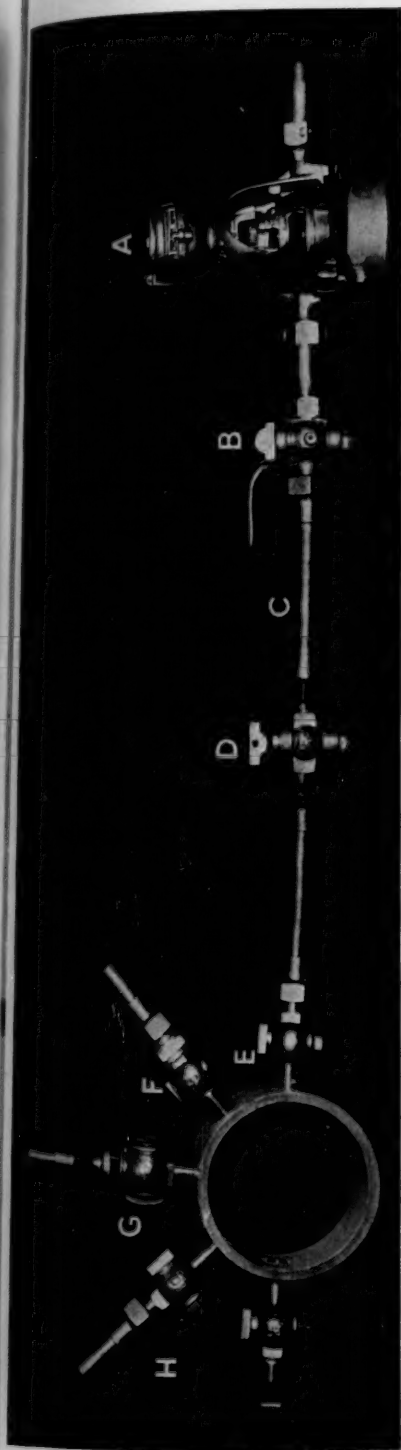
## meeting modern NEEDS

Hydrants need not be ugly. Look at the graceful line of this Ludlow #90.

It is as modern in mechanical construction as in appearance. Will not leak if accidentally broken by trucks. Can be repaired without shutting main or digging.



*The* LUDLOW  
VALVE MFG. COMPANY  
TROY . . . . NEW YORK



## Products of Proven Reliability—

- |                                                                                                                                                 |                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| A. King F. P. Disc Meter. No internal screws. Frost protection for intermediate gear train, disc chamber and casing.                            | E. U. W. M. Co. 3/4" Corporation Cock, copper pipe outlet.      |
| B. U. W. M. Co. 3/4" Combination Lever Handle Waste Stop (bronze handle); inlet male end for 3/4" copper pipe; outlet female end for iron pipe. | F. U. W. M. Co. 3/4" Lead Flange to 3/4" Copper Pipe Adaptor.   |
| C. U. W. M. Co. Copper Tubing.                                                                                                                  | G. U. W. M. Co. 1" Lead Flange to 1" Copper Pipe Adaptor.       |
| D. U. W. M. Co. 1" x 3/4" x 1" Male End Tee Head Curb Stop with copper pipe sleeves.                                                            | H. U. W. M. Co. 3/4" Long End Corporation Cock for Copper Pipe. |
|                                                                                                                                                 | I. U. W. M. Co. 3/4" Standard Corporation Cock.                 |

UNION WATER METER COMPANY - Worcester, Mass.

**"And that, Gentlemen, is what I call Metering!"**

(FORT WORTH, TEXAS, JULY 1934 REPORT)

Venturi-water in from Lake Worth = 528,905,000 gals.

" - used as wash water = 9,666,000 gals.

Total water in Clear Well = 519,239,000 gals.

Water pumped to city -  
totals of 4 Venturis = 520,280,000 gals.

Meter difference = 1,041,000

$$\frac{1,041,000}{519,239,000} = \frac{1}{5}^{\text{th}} \text{ of } 1\%$$

**Builders Iron Foundry, Providence, R.I.**



# GRAVER

**WATER TREATING  
AND STORAGE**

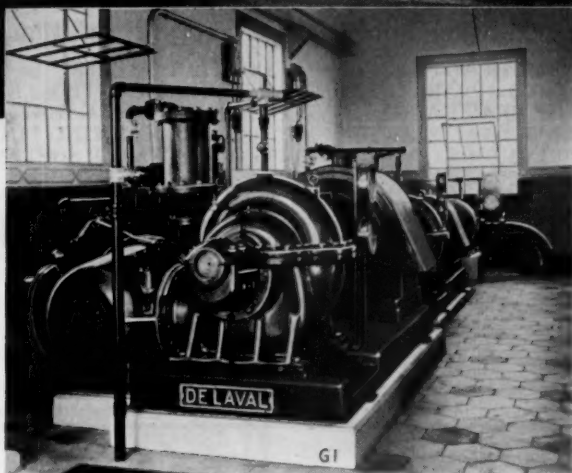
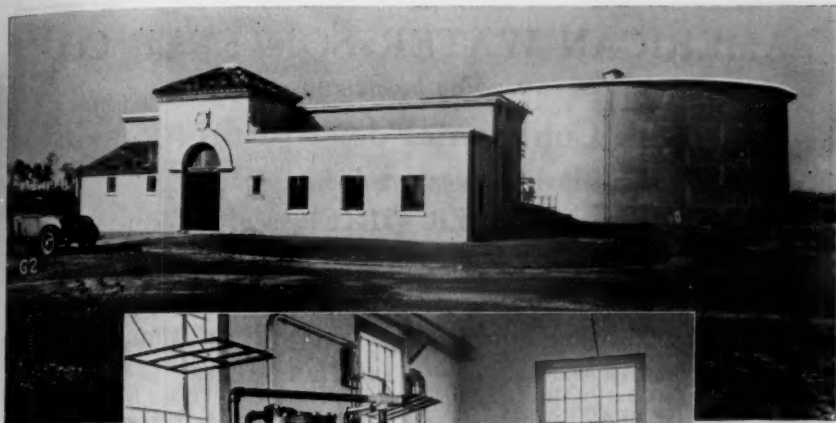
Tanks on concrete bases and fabrication of steel and alloy plate to all the requirements of industrial and public works. Nearly 75 years in steel plate fabrication. Reliable consulting, designing engineering service. Write for bulletins.



**GRAVER TANK & MFG. CORP.**

General Sales Office:  
332 South Michigan Avenue, Chicago  
Representatives in Principal Cities

General Offices and Factory:  
East Chicago, Indiana



*"the efficiency of the pump is still practically the 83.5%, as it was when put into operation three years ago."*

Mr. R. G. Ridgely, Supt. of the Pinellas (Fla.) Water Company, has kept very accurate record of his five **DE LAVAL PUMPS**. When installed in 1930 the 3 M.G.D. unit showed an efficiency of 83.5%. The Venturi meter and the watt-meter charts show that the efficiency is still practically the same, as stated in the above quotation from a letter, in which he adds that he has "had no difficulties with any of the pumps."

The fact that De Laval pumps now installed in American municipal water works systems could supply the domestic requirements of the entire United States is evidence that Mr. Ridgely's experience is representative.

**DE LAVAL STEAM TURBINE COMPANY**  
*Trenton, New Jersey*

## AMERICAN WATER SOFTENER CO.

*including by purchase*

New York Continental Jewell Filtration Co.

Over 500 Municipal Purification Plants installed.

WATER FILTERS  
WATER SOFTENERS  
ACID PUMPS

Water Purification Equipment of every description.

DRY CHEMICAL FEEDERS  
WET FEED APPARATUS  
LOSS OF HEAD GAUGES  
IRON REMOVAL PLANTS  
CHLORINATORS

CONTROL TABLES  
EFFLUENT CONTROLLERS  
RATE OF FLOW GAUGES  
WATER SOFTENING PLANTS  
ZEOLITE WATER SOFTENERS

And Originator of the NEW ELECTRO-MAGNETIC PROPORTIONERS, with MICROMETER adjustment, for feeding all kinds of Chemicals, Coagulants, etc.

AMERICAN WATER SOFTENER CO.

Lehigh Avenue and Fourth St. PHILADELPHIA, PA.

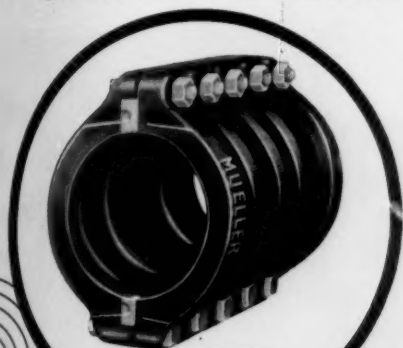
## CLEAN YOUR WATER MAINS

One does not have to be an expert mathematician to figure out that a clogged water main calls for a stronger pressure and that in turn calls for more coal—and literally burning up money. We can show you how to get dollar for dollar value out of every ton of coal. We can show you how to clean the water mains quickly and cheaply. Send us your address—that's all we ask of you.

National Water Main Cleaning Co.

CHURCH AND DEY STREETS

NEW YORK CITY



Mueller H-776 Heavy Pressure Split Repair Sleeves are furnished in the following range of sizes: 4" (length 18"), 6" (length 18 3/4" and 18"), 8" (length 13 1/4" or 18 1/2"), 10" (length 14 1/4" or 20 1/2"), 12" (length 16 1/8" or 22 1/2"), 14" (length 18 1/8"), 16" (length 18 1/2"), 20" (length 22 1/2").



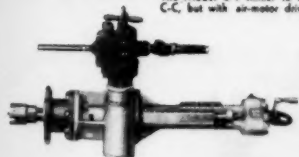
Heavy pressure tapping crosses for use with Mueller or other standard drilling machines are illustrated above with ball and spigot outlets and below with flanged outlets. Standard types are tested to 300 lbs. pressure.



The new Model "C-C" manually operated drilling machine is illustrated below. It makes cuts from 2" to 18" in any size of main. Outstanding features are greater compactness, greater drilling capacity, new ease of handling and a new positive, automatic feed.



The Model C-1 similar to the C-C, but with an motor drive.



## Waterworks Requirements

*developed these tools and fittings*

More than fifty years of intimate contact with the waterworks field—of knowing what is needed and why—is expressed in Mueller equipment. That is why in application and in service Mueller stops, fittings, and tapping valves have merited their pre-eminent place in the esteem of waterworks men and why Mueller tools always prove to be "just what we needed."

On this page is shown typical equipment from the broad Mueller line. For complete descriptions, dimensions, etc., consult your Mueller Catalog "H".

Mueller Co., Decatur, Ill.

Factories: Decatur, Ill., Chattanooga, Tenn., Los Angeles, Calif., Sarnia, Ont.

Branches: New York and San Francisco

# MUELLER

WATER DISTRIBUTION  
EQUIPMENT

For a  
SUPERIOR PIPE LINE  
combining  
LOW FIRST COST —  
LONG LIFE —  
and  
LOW MAINTENANCE



Alco Pipe ready for installation in Cleveland, Ohio  
(Contractor: A. L. Connelly Co.)

Specify . . .

## ALCO ELECTRIC WELDED STEEL PIPE

Alco Pipe is insurance against costly breaks caused by water hammer, nearby blasting, street vibrations, washouts, supporting ground failures and many other causes.

Alco dip coating applied after all mill scale and dirt have been removed by shot blasting, leaves a lustrous protective finish inside and out. The coating is practically impregnated into the steel, adding many years to the life of the pipe and greatly increasing its carrying capacity.

Alco Pipe is fabricated in forty-foot standard lengths. The result is low installation cost with fewer joints, fewer bell holes and fewer lengths of pipe to handle.

Leakage from an Alco line is almost nil.

WRITE FOR—



BULLETIN 1016



**ALCO PRODUCTS, INCORPORATED**  
220 East 42nd Street • New York, N. Y.

Branch Offices:

CHICAGO WASHINGTON HOUSTON TULSA  
Plants at Dunkirk, N. Y., and Montreal, Canada. Cable Address: Alproducts  
DIVISION OF AMERICAN LOCOMOTIVE COMPANY



End supports 34 feet apart. 100 lbs. pressure still in line and deflection of over 11 inches with joint still tight.

## ELIMINATE THAT LEAKAGE



**L**EAKY joints have a bearing on many of the problems which water company and water department officials are continually faced with. Unaccounted for water—excessive pumping charges—digging up costly pavements—even renewing pipe lines on account of lowered carrying capacity. Many of these worries can be avoided by making all new joints with Hydro-Tite.

Should a pipe line jointed with Hydro-Tite settle, as shown in the above picture, the joints will remain tight. Lines jointed with Hydro-Tite remain tight year after year and systems completely installed with Hydro-Tite joints are the tightest on record.

Hydro-Tite joints never blow out—have a record of over 20 years—require no caulking and save from 50% to 75% as compared with lead. Write for information on any phase of joint making.

### HYDRAULIC DEVELOPMENT CORPORATION

Main Sales Office: 50 Church Street, New York, N. Y.  
General Offices and Works: West Medford Station, Boston, Mass.

# HYDRO-TITE

Reg. U.S. Pat. Off.

---

A DEPENDABLE SELF - CAULKING JOINT COMPOUND

---

## COMING MEETINGS

*December 28, 1934*—New York Section—Hotel New Yorker, New York, N. Y. Secretary, R. K. Blanchard, Neptune Meter Co., 50 W. 50th St., New York, N. Y.

*March 27-29, 1935*—Canadian Section—Hotel London, London, Ont., Canada. Secretary, A. E. Berry, Ontario Department of Health, Parliament Bldgs., Toronto, Ont., Canada.

*May 6-10, 1935*—Annual Convention of American Water Works Association—Hotel Netherland Plaza, Cincinnati, O. Secretary, B. C. Little, 29 W. 39th St., New York, N. Y.

*May 16-18, 1935*—Pacific Northwest Section—Lewiston, Idaho. Secretary, E. C. Willard, 720 Corbett Bldg., Portland, Ore.

*October 14-17, 1935*—Southwest Section—Houston, Texas. Secretary, Lewis A. Quigley, Supt., City Water Works, 2611 S. Adams St., Fort Worth, Tex.

*October 23-26, 1935*—California Section—San Diego, Calif. Secretary, J. E. Phillips, Department of Water and Power, Box 240, Arcade Annex, Los Angeles, Calif.

## Rensselaer GATE VALVES

have these superior advantages:

Straightway passage the full diameter of connecting pipe

Parallel faces or gates having a tendency to scrape off any foreign substance when operated

Wedges independent of stem and stem nut, allowing stem to work easy and without binding.

They are made suitable for use on Water, Gas, Steam Oil, etc., and are manufactured in all commercial sizes. We can furnish them with any style end connection; any style of gearing; any size Hydraulic Cylinder; and for Motor operation, to suit specifications.



Hub Ends.

## Corey FIRE HYDRANTS

have these superior advantages:

Bronze working parts.

Non-freezing.

Positive drip valve.

Rubber valves "Goodrich Quality."

Interchangeable working parts.

All working parts removable through top, avoiding necessity of digging up entire Hydrant when repairs are made (which is seldom).

No water-hammer can be caused if closed too quick.

Valve remains tightly closed should standpipe be broken off above ground (by accident). No flooding of ground around Hydrant.

We have manufactured Coreys since 1896, and we believe they are the best Fire Hydrants on the market. Unless otherwise ordered, they are made suitable for a working pressure of 150 pounds per square inch, and each Hydrant is tested to 300 pounds per square inch. We can build them for greater working pressures if required.



Plain Hose Nozzle Type with Plain Steamer Nozzle.

ASK FOR CATALOGUE "G"

**RENSSELAER VALVE COMPANY**

TROY, N. Y.

BRANCH OFFICES

NEW YORK, Hudson Terminal Bldg.

CHICAGO, Monadnock Block

SAN FRANCISCO, Sharon Bldg.

PITTSBURGH, Oliver Bldg.

LOUISVILLE, Starks Bldg.

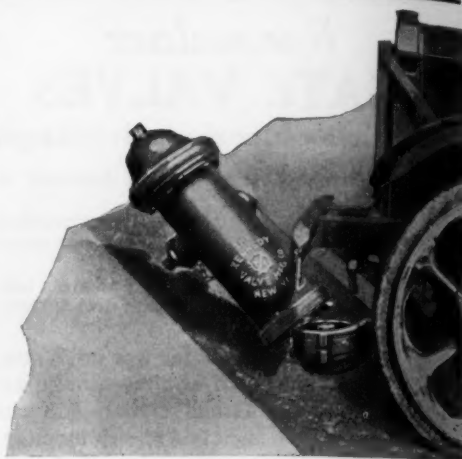
SEATTLE, Arctic Bldg.

LOS ANGELES, Subway Terminal Bldg.

NEW ENGLAND, C. L. Brown, Northboro, Mass.

# Crash!

*but this hydrant can be repaired within half an hour, at a total cost of \$10.00, without excavating or shutting off the water supply*



## The Kennedy SAFETOP Fire Hydrant

REG. U. S. PAT. OFF.

will withstand any impact that hydrants now commonly used will endure without breaking. However, if broken by a collision from a truck or automobile, the only parts that need be replaced are an inexpensive standpipe breaking ring and stem coupling, and one man can do the job without difficulty.

Compare this with the time, the labor, the general trouble, and the total expense involved in repairing your present fire hydrants if accidentally broken. And further, this unique patented hydrant is flood-proof and frost-proof, and has remarkably low friction loss. Without excavating, it is quickly adjustable to raise of street grade and its nozzles can readily be made to face any desired position exactly. It can be adapted to any of your present types of hydrant elbows quickly and at low cost.

*Write for complete information*

**THE KENNEDY VALVE MFG. CO.**

**Elmira, N. Y.**

*Representatives in principals cities*



# KENNEDY

# SAFETOP FIRE HYDRANT

REG. U. S. PAT. OFF.



THE L. H. NASH METER

National meters stay on the job and do a good job without constant servicing.

They are lastingly and dependably accurate without periodical reconstruction or renewal of parts.

For maximum revenue from metering, standardize on National meters.

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## NATIONAL METER COMPANY

Executive Offices and Factory: 4203 First Avenue, Brooklyn, N. Y.

BOSTON CHICAGO DALLAS LOS ANGELES SAN FRANCISCO

**THE  
AMERICAN JOURNAL OF PUBLIC HEALTH**

*official publication of the*

**AMERICAN PUBLIC HEALTH ASSOCIATION**

The objective of the American Journal of Public Health is to present in one place every month the advances along every salient in community health protection and promotion.

A record of progress and change in health administration and modern public health practices must necessarily include considerable material on water works engineering.

That is why the American Journal of Public Health pays attention to important developments in this field and presents them in their proper relationship to other public health activities.

An hour spent with the Journal every month rewards the thoughtful reader with an accurate and complete picture of the entire field of public health.

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ASSOCIATION**

50 West 50th Street  
NEW YORK, N. Y.

畫  
意  
能  
達  
萬  
言

"One  
picture  
tells  
more  
than  
10,000  
words"

## Picturing Trident & Lambert INTERCHANGEABILITY



"They never  
become  
obsolete"

BOTH METERS have seen a generation of service. Contemporary equipment is long since discarded. But we cut away the casing to show how *modernized interchangeable parts* fit them—the pictures tell the story! You never *scrap* Tridents or Lamberts. "New models" never replace old ones. When at last they *do* wear—you just go to your small stock of improved interchangeable parts and slip in years more of accurate, low-cost, trouble-free service! We've a meter for every problem . . . get data from the Neptune Meter Company, 50 West 50th Street (Rockefeller Center), New York . . . or . . . Neptune-National Meters, Ltd., Toronto, Canada.

OVER  
**6,000,000**  
MADE AND SOLD

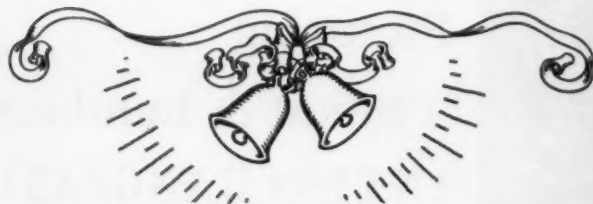
*Principal cities all over the U. S. use these famous meters. They have pioneered in the principal contributions to water meter accuracy, durability and simplicity. A study of their details is a revelation in fine balance and wear-reduction. And remember, they're interchangeable.*



# Trident

Pioneers in  
Meter  
Progress . . .  
Yesterday—  
TODAY—  
Tomorrow

and LAMBERT Age-less Water Meters



## Peace on Earth ... the year 'round!

**W**hat does Christmas mean to you?

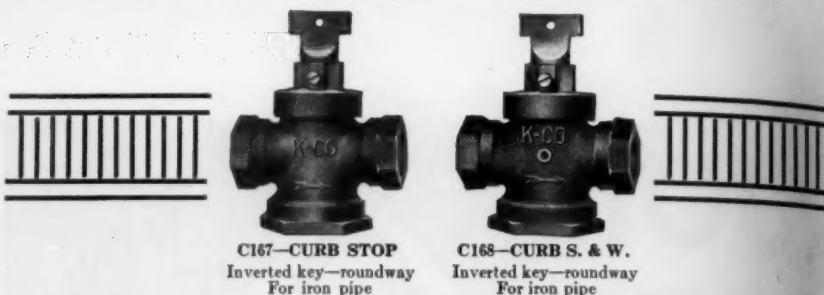
Holly and mistletoe . . . . the home-coming of  
dear ones . . . . greeting and feasting . . . . a  
glistening tree decked with fairy lights and bend-  
ing with gifts . . . . children's happy laughter . . . .  
contentment . . . . and peace . . . .

Whatever joy it brings you individually we wish  
you in abundant measure. May the cheery spirit  
of this Season last through the coming year and  
be still more abundantly renewed at Christmases  
to come.

Industrial Chemical Sales Company, Inc.  
230 Park Avenue • 205 W. Wacker Drive  
New York Chicago







## Quality Brass Goods for Water Companies

Kitson Inverted Key Curb Stops and Stops & Wastes, Corporation Stops, Tee and Lever Handle Stops and Stops & Waste, Water Meter Couplings and other Fittings for Water Works Usage—are all made of high grade Red Brass and are carefully machined. Plugs are accurately ground, properly lubricated and tested before leaving our factory to insure ease of working and freedom from leakage.

"SEND FOR LITERATURE AND PRICES"



"Since 1897"



### THE STANDARD FOR 50 YEARS

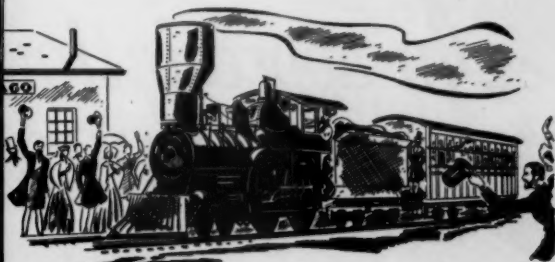
Automatic Pressure Control Valves  
Water Works Specialties  
Altitude — Pressure Reducing — Surge  
Relief and Combination Valves  
Portable Fire Hydrants  
Hydraulic Booster Pumps

ROSS VALVE MFG. CO., INC. TROY, N. Y.



**FOR WATER SOFTENING  
AND IRON REMOVAL**

Zeolite Chemical Company, 144 Cedar Street, New York



Chicago laid this cast iron pipe in 1851, the year the first through train arrived from the East.

## Good for more Service *after 83 years*

The rugged old cast iron pipe shown above, part of Chicago's original water line laid in 1851, was recently inspected and found in good condition. Part of this 83-year-old original line is still in service in State Street, the heart of Chicago's retail district. Over 80 per cent of the original pipe is still in service. Chicago's entire distribution system consists, as it always has, of nothing but cast iron pipe.

In older cities of Europe and the United States, cast iron mains still in use, after serving 100 to 200 years and longer, were recently uncovered and inspected. All were in satisfactory condition

for further service. Thus, evidence accumulates to prove that the useful life of cast iron pipe is *more than a century*. The reason for the long life and low maintenance cost of cast iron pipe is its effective resistance to rust. Cast iron is the one ferrous metal for water and gas mains, and for sewer construction, that will not disintegrate from rust. This characteristic makes cast iron pipe the most practicable for underground mains since rust will not destroy it.

For further information, address The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 309 Peoples Gas Building, Chicago, Illinois.

*Methods of evaluating bids now in use by engineers rate the useful life of cast iron pipe at 100 years*

# CAST IRON PIPE

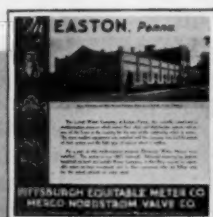
Look for this



trade-mark

*An appreciation of value!*

*1,883  
new  
accounts  
in the  
last  
3 years*



**PITTSBURGH EQUITABLE METER CO.**  
**MERCO NORDSTROM VALVE CO.**

MAIN OFFICES PITTSBURGH, PA.

New York Columbia Chicago Kansas City Philadelphia Tulsa Houston Los Angeles Oakland

DEC 27 1934

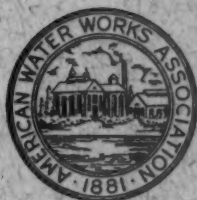
55TH ANNUAL CONVENTION, CINCINNATI, OHIO, MAY 6-10, 1935

VOL. 26, NO. 12

DECEMBER, 1934

PROCEEDINGS 52ND YEAR

# JOURNAL OF THE AMERICAN WATER WORKS ASSOCIATION



PUBLISHED MONTHLY

BY THE

AMERICAN WATER WORKS ASSOCIATION

SECRETARY'S OFFICE, 29 WEST 39TH STREET, NEW YORK  
EDITOR'S OFFICE, 2411 NORTH CHARLES STREET, BALTIMORE, MARYLAND



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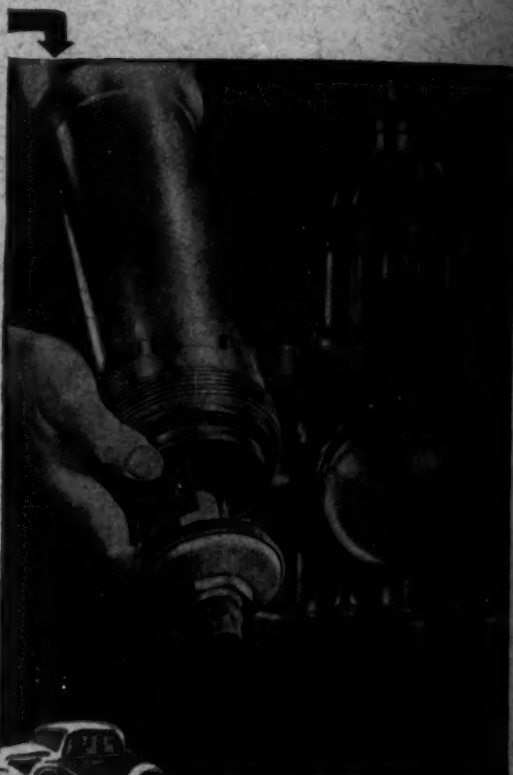
Made in United States of America

# SPECIFY MATHEWS

## FOR THE WINTER-DEFENCES

### PICTURED HERE

This photo shows three of the many qualities in Mathews Hydrants which guarantee fire protection through the bitterest weather. The positive and automatic drain valve is actually part of the main valve. As the hydrant opens, the leather face moves across the orifice, closing it. It slides away when the hydrant closes; draining standing water and preventing ice formation. Note the operating nut at the very top of the hydrant. Like a gable roof, it keeps rain and spray from entering and freezing around the revolving nut. The entire barrel including all working parts is removable through a loose protection case (not shown) which receives the thrust of frozen ground and protects the hydrant itself from injury. Get these money-saving advantages at a standard hydrant price.



### "SAND-SPUN" PIPE

"Sand-Spun" pipe is Cast Iron—a superior pipe with an individual sand mould for every pipe . . . Obtainable in 16 ft. and 20 ft. lengths. These longer lengths save 30% to 60% in jointing materials and handling, as compared to 12 ft. lengths.

**R.D. WOOD CO.** 400 CHESTNUT STREET  
PHILADELPHIA

PUBLISHED MONTHLY AT MOUNT ROYAL AND GUILFORD AVENUES, BALTIMORE, MD.

Entered as second class matter April 10, 1914 at the Post Office at Baltimore, Md., under the act of August 24, 1912. Accepted for mailing at a special rate of postage provided for in section 1103, Act of October 3, 1917; authorized August 6, 1918.

# V-TYPE SETS THE PACE



*New York—October 25:*  
Powered by a 12-cylinder V-Type Diesel engine a new stream-lined train resembling a huge yellow caterpillar rolled into Grand Central Terminal today with a cluster of new speed records to its credit.

Fifty-six hours and 55 minutes before this Union Pacific train had left Los Angeles. A new record for spanning the continent!

A mighty power unit drives the stream-lined train to new records—the V-Type Diesel. What's back of the remarkable performance records made by Hersey Water Meters? Another mighty power unit—the V-Type Piston.

Running at terrific speed one minute, barely nutating the next, the V-Type Piston never falters. Long years after a less efficiently designed power unit has been repaired or replaced, the V-Type Piston drives its train through high rates and low with an astonishingly low loss of original accuracy.

Perfect balance makes this possible. The Hersey V-Type Piston nutates without thrust, without a governor, without mechanical control of any kind. That explains not only Hersey accuracy, but the lack of wear on the "heart of the meter." The V-Type Piston is never a liability!

That's why Hersey Meters are in use in over 5000 water departments.

**HERSEY MANUFACTURING COMPANY**  
South Boston, Mass., Branch Offices: New York, 290 Broadway; Portland, Ore., 1231 N. W. Hoyt St.; Philadelphia, 214 Commercial Trust Bldg.; Atlanta, 510 Haas-Howell Bldg.; Dallas, 402 Praetorian Bldg.; Chicago, 844 Rush St.; San Francisco, 553 Howard St.; Los Angeles, 450 East Third St.

**HERSEY**  
**WATER METERS**



Four million cubic feet of water was passed through Hersey Disc Meter No. 835, 514. Tests show falling off of accuracy as follows:

- 4/10 of 1% at one million cubic feet
- 1-1/2% at two million cubic feet
- 1-4/10% at three million cubic feet
- 7/10 of 1% at four million cubic feet (approximate)

Ask any salesman to match his figures with this record!

**STANDARDIZE ON GOOD METERS**



# LEADITE

## Jointed for . . . Permanence with LEADITE

Generally speaking, most Water Mains are buried beneath the Earth's surface, to be forgotten,—they are to a large extent, laid for permanency. Not only must the pipe itself be dependable and long lived,—but the joints also must be tight, flexible, and long lived,—else leaky joints are apt to cause the great expense of digging up well-paved streets, beautiful parks and estates, etc.

Thus the "jointing material" used for bell and spigot Water Mains **MUST BE GOOD,—MUST BE DEPENDABLE,—**and that is just why so many Engineers, Water Works Men and Contractors aim to **PLAY ABSOLUTELY SAFE**, by specifying and using **LEADITE**.

Time has proven that **LEADITE** not only makes a tight, durable joint,—but that it improves with age.

*The pioneer self-caulking material for c.i. pipe.*

*Tested and used for over 30 years.*

*Saves at least 75%.*

**THE LEADITE COMPANY**  
Girard Trust Co. Bldg. Philadelphia, Pa.



## No Caulking



